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Order Without Social Norms: How Personal Norm Activation Can Protect the Environment

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I. INTRODUCTION

One of the greatest problems facing norms theorists and regulators is how to induce individuals to act who will not benefit personally and who are not subject to legal or social sanctions. Since the 1991 publication of *Order Without Law*, Robert Ellickson's path-breaking study of Shasta County ranchers, it has been clear to legal theorists that informal social norms have important influences on behavior. Ellickson and others have

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demonstrated the remarkable effects of social norms when the material benefits of cooperation to the individual are large and the behavior occurs in close-knit groups.[1] Yet in an increasingly crowded society, individuals face numerous situations in which acting in their personal interest will harm the collective interest, but their large numbers undermine the influence of legal and social sanctions. These social dilemmas arise on freeways, on city streets and subways, on the Internet, and even in increasingly populated rural areas.[2] At the core, these situations force us to confront whether the law can induce us to act because we believe we should, rather than because we fear legal or social sanctions.

In this Article, I suggest that the law can do so, but I also suggest that understanding how it can will require legal theorists to wade into the muddy waters of social psychology. I use a leading problem in environmental law both to develop a richer understanding of how beliefs activate norms and to demonstrate how norm activation theory can generate innovative solutions to the most challenging social dilemmas. The problem confronted by environmental law arises because the largest remaining contributor to many kinds of pollution today is the individual.[3] Not a sole individual, of course, but the aggregate of all individuals acting independently, each making a minute contribution to the overall problem. This surprising development results from the success of the regulatory campaign to reduce industrial pollution over the past three decades, combined with the inability of regulators to reduce the environmental impacts of a population that is increasing both in size and in per-capita consumption.[4]

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[1] *See* ROBERT C. ELLICKSON, ORDER WITHOUT LAW: HOW NEIGHBORS SETTLE DISPUTES (1991).

[2] *See, e.g.*, ERIC A. POSNER, LAW AND SOCIAL NORMS 112–32 (2000) (voting); Ann E. Carlson, *Recycling Norms*, 89 CAL. L. REV. 1231, 1231 (2001) (discussing recycling and air and water pollution); Robert Cooter, *Do Good Laws Make Good Citizens? An Economic Analysis of Internalized Norms*, 86 VA. L. REV. 1577, 1583–84, 1590 (2000) (pooper-scooper ordinances, civic acts); Dan M. Kahan, *Social Influence, Social Meaning, and Deterrence*, 83 VA. L. REV. 349, 358 (1997) (street crime and tax compliance); Richard H. McAdams, *The Origin, Development, and Regulation of Norms*, 96 MICH. L REV. 338, 382–83 (1997) (littering); Geoffrey P. Miller, *Norm Enforcement in the Public Sphere: The Case of Handicapped Parking*, 71 GEO. WASH. L. REV. 895, 898 (2003) (handicapped parking); Lior Jacob Strahilevitz, *Social Norms from Close-Knit Groups to Loose-Knit Groups*, 70 U. CHI. L. REV. 359 (2003) (driving, subway riding, and Internet file-sharing) [hereinafter Strahilevitz, *Loose-Knit Groups*]; Lior Jacob Strahilevitz, *Charismatic Code, Social Norms and the Emergence of Cooperation on the File-Swapping Networks*, 89 VA. L. REV. 505 (2003) (Internet file-sharing); Cass R. Sunstein, *Social Norms and Social Roles*, 96 COLUM. L. REV. 903, 909–25 (1996) (littering and roadside tipping). Although I focus here on social dilemmas, individuals often face comparable problems where there is an absence of correspondence between short-term and long-term outcomes for the individual. *See, e.g.*, David M. Messick & Carol L. McClelland, *Social Traps and Temporal Traps*, 9 PERSONALITY AND SOC. PSYCHOL. BULL. 105, 105 (1983) (distinguishing between "social traps" and "temporal traps").

[3] *See* Michael P. Vandenbergh, *From Smokestack to SUV: The Individual as Regulated Entity in the New Era of Environmental Law*, 57 VAND. L. REV. 515 (2004).

[4] *See* Douglas A. Kysar, *Law, Environment, and Vision*, 97 NW. U. L. REV. 675, 711–13 (2003) (discussing population and consumption trends).

Individual behaviors account for a remarkable percentage of many toxic emissions. Dioxin, one of the most toxic, persistent, and widespread pollutants in the world, provides a stark example.[5] Federal Environmental Protection Agency (EPA) regulations have reduced dioxin emissions from large industrial sources by over 90% since 1987.[6] As a result, the largest remaining source of dioxin emissions is a startling one: backyard burning of garbage, which now accounts for roughly 60% of all dioxin emissions in the United States—and is wholly unregulated at the federal level.[7] Other pollutants, ranging from climate change gases to smog-forming compounds, also owe a large portion of their genesis to individual behavior.[8] For example, the EPA has concluded that motor vehicles, consumer products, and other small, non-industrial sources now contribute 76% of all air toxics.[9] Similarly, in the Los Angeles area, motor vehicles, consumer products, and other small sources release 80% of all smog-forming compounds.[10] The relative importance of individual behavior can only be expected to increase in the future if regulators continue the traditional approach of targeting industrial sources while the population grows at a rate of 38% every thirty years.[11]

Yet experience shows that individual behavior is exceedingly hard to change. Command and control regulations—the instrument of choice since the inception of environmental regulation—have bleak prospects for success against individuals. Regulations that seek to direct personal behavior by fiat are exceedingly unpopular, and they are often inefficient and costly to enforce.[12] For example, efforts in 1990 by the Los Angeles-area air quality authority to reduce the smog caused by backyard grilling led to a backlash, with critics quipping "use a barbecue, go to jail."[13] Many economic incentives, such as taxes and tradable allowance schemes, also face daunting hurdles when applied to individuals.[14] Environmental taxes are wildly unpopular in the United States, and allowance schemes are difficult to develop and administer when the number of potential market participants is

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[5] *See* INST. OF MED. COMM., DIOXINS AND DIOXIN-LIKE COMPOUNDS IN THE FOOD SUPPLY: STRATEGIES TO DECREASE EXPOSURE 53–54 (2003) [hereinafter DIOXIN REPORT].

[6] *See id.* at 279 tbl.A-28.

[7] Dioxin is also the subject of limited state and local regulations. *See id.* at 38, 228–29 tbl.A-8.

[8] *See* Vandenbergh, *supra* note 3, at 541–84.

[9] *See* Office of Air and Radiation, U.S. EPA, *Air Trends: Toxic Air Pollutants* (providing source percentages based on 1996 National Toxics Inventory), *at* http://www.epa.gov/airtrends/toxic.html (last updated Sept. 21, 2004) [hereinafter EPA, *Air Trends*].

[10] *See* S. COAST AIR QUALITY MGMT. DIST., CLEANING THE AIR THAT WE BREATHE 5 (2003), *available at* http://www.aqmd.gov/pubinfo/Publications/collaterals/SupEng.pdf.

[11] The population of the United States in 2000 was 281 million, a 38% increase from the 1970 population. *See* U.S. EPA, DRAFT REPORT ON THE ENVIRONMENT 2003, at x (June 2003).

[12] *See* Vandenbergh, *supra* note 3, at 597–600.

[13] Gary Polakovic, *Chemicals in Home a Big Smog Source*, L.A. TIMES, Mar. 9, 2003, at B1 (noting that consumer products release 108 tons of smog-forming pollutants annually in the Los Angeles area).

[14] *See* Vandenbergh, *supra* note 3, at 600–08.

large and the emissions from any one individual are minute. Thus, it is no accident that individuals have remained largely beyond the reach of environmental regulation. But, if there is to be continued progress in the fight to improve environmental quality, something has to change.

Norms appear to provide a ready answer, at least on the surface. Norms include both social norms—informal obligations that are enforced through social sanctions or rewards;[15] and personal norms—obligations that are enforced through an internalized sense of duty to act and guilt or related emotions for failure to act.[16] In settings ranging from Ellickson's Shasta County ranchers, to diamond merchants,[17] to lobster fishermen,[18] cooperative behavior often occurs without regard to formal legal requirements. Each of these settings has two things in common: First, the individual stands to benefit from cooperation over the long term if others also cooperate; and second, the group setting provides opportunities for iterative relationships and the exchange of information, and thus, for social sanctions and rewards.[19] Even where close-knit group settings are absent, studies indicate that if the individual benefits sufficiently from complying with regulations, such as where safety benefits arise from seat belt and child safety seat requirements, norms may provide the additional incentive necessary to change behavior.[20] This scholarship thus fits comfortably within the dominant rational actor model: Once we account for the social costs and benefits, behavior change occurs because the change is in the individual's interest.

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[15] *See* Steven Hetcher, *Creating Safe Social Norms in a Dangerous World*, 73 S. CAL. L. REV. 1 (1999) (discussing social norms and customs); Richard H. McAdams, *Accounting for Norms*, 1997 WIS. L. REV. 625, 634 (noting that "much of [the] literature agrees that norms are informal obligations"); McAdams, *supra* note 2, at 340 (describing social norms as "informal social regularities that individuals feel obligated to follow because of an internalized sense of duty, because of a fear of social sanctions, or both").

[16] *See* McAdams, *supra* note 2, at 626–30 (noting the terms used for internalized norms); *see also* Shalom H. Schwartz, *Normative Influences on Altruism*, *in* ADVANCES IN EXPERIMENTAL SOCIAL PSYCHOLOGY 221, 231 (L. Berkowitz ed., 1977) (noting that "the sanctions attached to personal norms are tied to the self-concept. Anticipation of or actual conformity to a self-expectation results in pride, enhanced self-esteem, security, or other favorable self-evaluations; violation or its anticipation produce guilt, self-deprecation, loss of self-esteem, or other negative self-evaluations.").

[17] Lisa Bernstein, *Opting out of the Legal System: Extralegal Contractual Relations in the Diamond Industry*, 21 J. LEGAL STUD. 115 (1992) (diamond merchants); *see also* Robert Cooter & Janet T. Landa, *Personal Versus Impersonal Trade: The Size of Trading Groups and Contract Law*, 4 INT'L REV. L. & ECON. 15 (1984) (Asian traders); Stewart Macaulay, *Non-Contractual Relations in Business: A Preliminary Study*, 28 AM. SOC. REV. 55 (1963) (business managers).

[18] ELINOR OSTROM, GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION (1990) (reviewing common pool resource problems).

[19] *See* ELLICKSON, *supra* note 1, at 181 (identifying a common definition of a close-knit group: "a social network whose members have credible and reciprocal prospects for the application of power against one another and a good supply of information on past and present internal events"). For brevity, in the remainder of the Article I only refer to social sanctions, not social rewards.

[20] *See* discussion *infra* note 31.

The behaviors that release dioxin and many other pollutants, however, often occur in situations that raise a more difficult question: whether norms also have a meaningful influence when the payoff to the individual is negative and the behavior does not occur in close-knit groups.[21] These situations often arise when an individual externalizes the harm caused by her behavior, and thus the costs of behavior change to the individual in terms of effort or money exceed the benefits. At least in theory, in these situations the individual will not be motivated to act based on self-interest. Social sanctions will not change the individual payoff because the individual will either act in isolation or in a setting with insufficient iterative relationships or information exchange to enable social norm sanctioning to occur. I refer to situations in which the individual's actions are not observable by others and situations in which the actions are observable but occur in non-close-knit groups as loose-knit group situations.[22]

A profoundly pessimistic conclusion lies at the core of recent environmental scholarship regarding behavior change in these negative-payoff, loose-knit group situations. When the desired behavior requires sustained or substantial effort, studies of responses to recycling norm campaigns suggest that they have limited effects unless they are of the expensive, face-to-face variety, or the government invests in financial incentives or the infrastructure necessary to make the behavior convenient.[23] Studies of product labeling have reached similar conclusions.[24] The problem is circular, however: Norm-based efforts are unlikely to make meaningful changes in nega-

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[21] Professor Ann Carlson describes this as a "large-number, small-payoff" problem. *See* Carlson, *supra* note 2, at 1231. I follow her approach of analyzing the material payoffs for the individual as a distinct issue before analyzing the material or psychic payoffs that may be affected by the characteristics of the group. Group characteristics affect the individual's payoff by enabling social sanctions that can have material or psychic effects on the individual, thus the group characteristics ultimately must be included in the analysis of the individual's payoff. By first analyzing the individual's payoff absent the effects of social sanctions, however, Carlson's approach enables distinctions to be identified in the types of situations that are most affected by social norms. In particular, the analysis of payoff before social sanctions are considered helps to identify the hard cases: where the underlying payoffs are negative absent social sanctions, and where group characteristics make it unlikely that the payoff will change after social sanctions are included. No shorthand term can capture all of the attributes relevant to norm functioning, but I use "negative-payoff, loose-knit group" in this Article. I use negative-payoff to reflect the concept that when the individual has an incentive not to act without consideration of social sanctions, the traditional rational actor theory suggests that an individual will not act. I use loose-knit group to reflect the concept that social influences are less likely to affect behavior where the setting does not enable the iterative relationships and information exchange that facilitate social sanctioning. Small group size is highly correlated with close-knittedness but is not essential. *See, e.g.*, ELLICKSON, *supra* note 1, at 182. Other scholars have used other terms to describe the situations in which the effects of social sanctions are likely to vary. *See, e.g.*, Miller, *supra* note 2, at 897 (identifying "cooperative" and "noncooperative" situations); Strahilevitz, *Loose-Knit Groups*, *supra* note 2, at 361–67 (proposing "intermediate-knit" groups).

[22] Actions that are not observable by others resemble actions in loose-knit group situations in that the opportunity for social sanctions is often small or nonexistent.

[23] *See* Carlson, *supra* note 2, at 1300 (noting "undue optimism" about the role of norms).

[24] *See* discussion *infra* notes 138–144.

tive-payoff, loose-knit group situations without government intervention, yet government intervention is unlikely to occur without changes in norms.

In this Article, I propose a first step to enable norm-based behavior change to occur even in the absence of widespread initial public support for government intervention. Drawing on several important strands of scholarship, including the norms scholarship in the legal and social psychological literatures and recent work on informational regulation,[25] I explore how focusing initially on personal norms rather than social norms may enable government to have a substantial effect on individual behavior in negative-payoff, loose-knit group situations. Although this approach has implications for a variety of activities (such as voting,[26] Internet file-sharing,[27] and handicapped parking enforcement[28]), I focus primarily on environmental problems and the control of toxic chemical releases in particular.

This new approach conscripts the concept of norm activation, which has been developed and tested empirically by social psychologists, to identify how belief change can activate personal norms, inducing individuals to feel a sense of obligation to act even where the payoff is otherwise negative. I draw on empirical studies to demonstrate that abstract norms of environmental protection and of reciprocity are widespread and have a large influence on individual behavior. To increase the effects of these norms, I suggest that the law should provide the information necessary to induce individuals to form new beliefs about the *mean* and *aggregate* effects of individual behavior (to activate norms related to environmental protection) and about the *relative* share of those effects as compared to industry and other sources (to activate norms related to reciprocity).

The Article proceeds in five parts. Using releases of toxics as an example, Part II develops the theory that personal norms, rather than social norms, provide the appropriate framework for addressing negative-payoff, loose-knit group situations. It then argues that the key to affecting behavior in these settings lies in developing the ability to activate the relevant personal norms. Part III demonstrates that norm activation theory provides a more complete explanation of the limited effects generated by recycling norm campaigns and product labeling schemes. Turning to regulatory reform, Part IV proposes a way to implement the theoretical insights developed in the first two parts. This proposal, entitled the Individual Toxic Release Inventory ("ITRI"), draws on current release reporting requirements for large industrial sources of toxics, modifying the methodology to apply to individual behavior. In particular, it provides a scheme for identi-

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[25] Informational regulation refers to the use of information disclosure to achieve regulatory ends. *See* discussion *infra* notes 159–160.

[26] *See* Cooter, *supra* note 2, at 1578.

[27] Steven Hetcher, *The FTC as Internet Privacy Norm Entrepreneur*, 53 VAND. L. REV. 2041, 2046 (2000); Strahilevitz, *Loose-Knit Groups*, *supra* note 2, at 361–62.

[28] Miller, *supra* note 2, at 897.

fying and publishing the types of data on toxic releases that will activate personal norms. Part V then demonstrates how the personal norms activated by the ITRI information will lead to changes in behavior. In some cases, norm activation will change direct environmental behaviors. In many other cases, particularly where direct behavior change requires sustained or substantial effort, norm activation will generate the background political support necessary for policymakers to invest in financial incentives and new infrastructure. Norm activation thus provides a first step toward addressing the problem posed by the recycling and labeling studies. The Article concludes with a look at the broader implications of the theory and methodology followed here for norms theorists and regulators.

II. NORM ACTIVATION

The release of toxic chemicals by private individuals demonstrates the challenge posed by negative-payoff, loose-knit group situations and the value of norm activation theory. I begin by briefly identifying the types of situations in which individuals release toxics. I then demonstrate why addressing these situations will require a focus on personal norms, and I draw on the social psychological literature to develop a theory of environmental norm activation.

A. The Toxics Example

1. The Easy and Hard Cases.—Individuals often internalize the risks of their toxic releases, such as when they expose themselves to household chemicals. The health benefits of avoiding toxics exposure in these situations often exceed the costs of behavior change, creating incentives for change. At least in theory, these large-payoff situations render legal and social sanctions unnecessary. Behavior change should occur if the individual is provided with the information necessary to enable rational decisionmaking. Individuals also have incentives to change behavior when they expect that their behavior will trigger the social sanctions that can be levied in close-knit group settings.[29] Large-payoff, close-knit group situations thus

[29] In some situations, the social sanctions will reinforce behavior changes that also have a large payoff to the individual, such as the economic benefits that may arise over time when several farmers maintain a common irrigation ditch. To the extent the behavior change is required for a collective good, however, a rational actor will have incentives to free ride on others' efforts to produce or preserve the good and to not act because the actions of many people are required. *See* MANCUR OLSON, THE LOGIC OF COLLECTIVE ACTION: PUBLIC GOODS AND THE THEORY OF GROUPS (2d ed. 1971); Garrett Hardin, *The Tragedy of the Commons*, 162 SCIENCE 1243 (1968) (describing the "tragedy of the commons" that arises for common pool resources, such as clean water and air). In large-payoff, close-knit group situations, Ellickson and others have found that norms often provide a solution to collective action problems. *See* ELLICKSON, *supra* note 1, at 176–82; Elinor Ostrom, *Toward a Behavioral Theory Linking Trust, Reciprocity, and Reputation*, *in* TRUST & RECIPROCITY 19, at 21 (Elinor Ostrom & James Walker eds., 2003) (noting that at least thirty variables influence solutions to collective action problems).

present the easy case for norms theorists. Not surprisingly, norms theorists have identified a wide range of behaviors that are influenced by norms in large-payoff, close-knit group situations,[30] as well as situations in which only one of these conditions is present.[31]

The analysis I present in this Article will inform the debate about normative influence in these easy cases, but the question I address is the hard case, which scholars are only beginning to discuss: whether norms also can change behavior when the costs of behavior change to the individual exceed the benefits and when the behavior does not occur in close-knit group settings.[32] For toxics, a negative payoff may arise either when the individual externalizes the harm caused by her toxics use altogether, or when the harm arising from self-exposure is less than the costs of behavior change (e.g., the financial cost or effort required). In addition, social norms will have lit-

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[30] *See* discussion *supra* notes 17–19.

[31] Smoking, baby safety seat use, and motorcycle helmet use are examples of situations in which behavior change may involve large payoffs to the individual, but the behavior often occurs in loose-knit group situations. *See, e.g.*, Robert Cooter, *Normative Failure Theory of Law*, 82 CORNELL L. REV. 947, 976–77 (1997) (smoking); Lawrence Lessig, *The Regulation of Social Meaning*, 62 U. CHI. L. REV. 943, 964 (1995) (motorcycle helmets); Richard H. McAdams, *A Focal Point Theory of Expressive Law*, 86 VA. L. REV. 1649, 1713 (2000) (smoking); McAdams, *supra* note 2, at 407–08 (baby safety seats); Sunstein, *supra* note 2, at 930 (smoking).

[32] For this analysis, in determining whether the payoff is negative at the outset I omit the material or psychic costs of social norm sanctions and the material or psychic costs to the individual of violating a personal norm. *See* discussion *supra* note 21. After evaluating the group characteristics, however, the material and psychic costs of violating social norms can be assessed and included in the payoff determination. *See, e.g.*, Carlson, *supra* note 2, at 1237–38 (noting that "[n]orms enrich rational choice theory by incorporating into the cost-benefit calculus the psychic costs and benefits individuals experience from complying with or violating norms"). The costs of violating a personal norm also can be included as an additional cost to the individual, but personal norms that account for the well-being of other people or the environment pose a challenge. Following a "thin" rational actor approach in which rational action is simply maximization of ends, an individual who acts pursuant to such a norm could be thought to act rationally if she receives psychic benefits from satisfying the norm that exceed the material costs of the act. In this analysis, the individual can be thought to have a "taste" for altruism and the altruistic act may not impose a negative-payoff on the individual. *See* Cooter, *supra* note 2, at 1579; *see also* Russell B. Korobkin & Thomas S. Ulen, *Law and Behavioral Science: Removing the Rationality Assumption from Law and Economics*, 88 CAL. L. REV. 1051, 1060–67 (2000) (discussing thick and thin rational choice models). Law and economics scholars argue that it is difficult to generate falsifiable predictions using this approach. *See id.* at 1061–64. Following the dominant "thick" rational actor approach in which the individual is presumed to seek self-interest, however, leads to a problem: If the individual is presumed to be self-interest seeking, it is difficult to account for the psychic cost to the individual of violating an altruistic norm. *See id.* at 1066; *see also* Ostrom, *supra* note 29, at 64 n.3 (noting that a "core assumption[]" of the dominant rational actor model is the "maximization of expected net benefits unconstrained by internal norms of behavior"). Nevertheless, whether the guilt that arises from violating a personal norm is characterized as a cost to a rational actor or a deviation from rational action, to the extent personal norms affect behavior, the identification of the relevant personal norms and the belief changes that activate them may be the only way to predict some behaviors, even if these predictions only hold for certain subpopulations. *Cf.* Cooter, *supra* note 2, at 1579 (suggesting that social scientists "describe the values internalized by people, predict the effects of internalized values on society, and explain why some people internalize values that others do not internalize").

tle influence on the payoff when the behavior occurs in a loose-knit group setting.[33]

2. Toxic Releases by Individuals.—The releases of toxic chemicals by individuals provide a striking example of the importance of the easy and hard cases for regulators. Individual behavior is a large and growing source of the releases of pollutants ranging from smog precursors, to petroleum to climate change gases.[34] Toxic chemical releases by individuals are no exception, and two toxics, dioxin and acrolein, demonstrate the extent of the releases and the easy and hard case situations in which they occur.

As discussed at the outset, dioxin is a leading target of regulators. Table 1 identifies the top five leading sources based on data included in a recent report by the Institute of Medicine of the National Academy of Sciences.[35]

	1987 (gTEQ/y)		1995		2002/2004	
1.	Municipal solid waste incineration, air	8877	Municipal solid waste incineration, air	1250	Backyard barrel burning, air	628
2.	Medical waste incineration, air	2590	Backyard barrel burning, air	628	Sewage sludge, land	77
3.	Secondary copper smelting, air	983	Medical waste incineration, air	488	Residential wood burning, air	63
4.	Backyard barrel burning, air	604	Secondary copper smelting, air	271	Coal-fired utilities, air	60
5.	Bleached pulp and paper mills, water	356	Cement kilns (hazardous waste), air	156	Diesel trucks, air	36
	All others	*585*	All others	459	All others	243
	Total	13,995	Total	3252	Total	1106

TABLE 1: LEADING SOURCES OF DIOXIN IN THE UNITED STATES

As Table 1 indicates, the overall releases of dioxin have declined substantially over the last twenty years, and reductions in industrial emissions

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[33] *See* discussion *supra* notes 21–22. Although the prospects for social pressure are greatly diminished in loose-knit group situations, they should not be discounted altogether. *See* Richard H. McAdams, *An Attitudinal Theory of Expressive Law*, 79 OR. L. REV. 339, 343–47 (2000); Miller, *supra* note 2, at 898. In addition, although a behavior may occur in a loose-knit group (e.g., on a highway), individuals who are important to the actor also may be present (e.g., family passengers), and social sanctions may thus still be possible. *See* Strahilevitz, *Loose-Knit Groups*, *supra* note 2, at 360.

[34] Vandenbergh, *supra* note 3, at 537–84; *see also* Carlson, *supra* note 2, at 1249.

[35] *See* DIOXIN REPORT, *supra* note 5, at 279 tbl.A-28. Totals are expressed in grams of toxicity equivalence (gTEQ) to a common form of dioxin and are rounded to the nearest whole number. *Id.*

account for the bulk of the overall decline. At the same time, individual behaviors such as the burning of garbage in backyard barrels remain largely unregulated, and the relative share of total dioxin emissions created by backyard burning increased in each time increment depicted in Table 1. Urban or suburban readers accustomed to municipal garbage collection will find this curious, but in many rural areas garbage burning is common, and if certain plastics are included in the garbage, releases of dioxin will often occur.[36] Today, backyard barrel burning is by far the leading source of dioxin in the United States, representing almost 60% of the total; and a second individual behavior, residential wood burning, is now the third leading source. Though the risks created by individual emissions of dioxin are difficult to estimate, the total amounts and relative share make it clear that individual behavior is by far the largest remaining source.[37]

The individual behaviors that release dioxin occur in easy and hard case situations. For example, an easy case situation arises when an individual burns garbage in her backyard barrel in plain sight of family members or neighbors in a small town, and the fumes settle on her yard and the yards of neighbors. She not only may obtain a large payoff if she reduces consumption of dioxin-contaminated garden vegetables and dermal contact with dioxin on the lawn, she also may avoid social sanctions by family members or neighbors who are aware of the dioxin contamination. In this large-payoff, close-knit group situation, information about the dioxin releases and their potential effects may be sufficient to change behavior.[38] Individuals release many types of toxics in easy case situations, and these types of releases make up such a large share of many individuals' toxic chemical exposure that one researcher has suggested that they create a "personal cloud" effect.[39]

Dioxin-releasing behaviors also occur in hard case situations. For example, barrel burning emissions may not settle in the vicinity of the barrel, but may drift onto the gardens and farms of others miles away (e.g., if the emissions are carried away by the prevailing winds). The harms thus are

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[36] *See* PAUL M. LEMIEUX, EVALUATION OF EMISSIONS FROM THE OPEN BURNING OF HOUSEHOLD WASTE IN BARRELS, TECHNICAL REPORT ii (1997), *available at* http://www.epa.gov/ttn/catc/dirl/barlbrn1.pdf.

[37] *See* discussion *infra* notes 217–228.

[38] This assumes that behavior change, such as removing dioxin-releasing items from the garbage or using a garbage collection service, is less costly to the individual than the dioxin exposure. This will be the case for many individuals. For example, barrel burning often occurs in suburban neighborhoods where garbage collection services are available, but the barrels, which are still used on occasion, are relics of earlier periods when collection was unavailable. Telephone Interview by Michael Vandenbergh with Laura Artates, Nashville Public Health Department, Pollution Control Division (Dec. 16, 2003).

[39] *See* U.S. EPA, REGION/ORD/OAR WORKSHOP ON AIR TOXICS EXPOSURE ASSESSMENT; SUMMARY REPORT 13 (2002) (response of Professor John Adgate to question about the results of a Minneapolis-St. Paul toxic chemical exposure study). For example, individuals often expose themselves to the toxic chemicals they use through dermal contact with household chemicals and inhalation of the exhaust from lawn and garden equipment. *Id.* at 54.

externalized and the costs to the individual of behavior change often exceed the benefits. Individuals may also engage in barrel burning in loose-knit group situations, such as in an isolated rural setting or a vacant urban lot in a neighborhood with a transient population.

Many other types of toxics are also released in hard case situations, and the release of acrolein provides an important example. Acrolein is an obscure chemical to most of us, but the EPA has concluded that, of all air toxics, acrolein poses the greatest risk for significant non-cancer chronic adverse effects nationwide.[40] Acrolein forms from the incomplete combustion of gasoline and diesel fuel in motor vehicles, and from a variety of other sources.[41] Individuals release acrolein largely through motor vehicle tailpipe emissions, and motor vehicle emissions are the largest source of acrolein air emissions in the United States. In fact, simply by driving, individuals release more than eighty times as much acrolein as all large industrial facilities combined.[42]

The emissions from a tailpipe typically affect the ambient air and the air inside the following vehicles, not the air inside the driver's vehicle.[43]

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[40] EPA, *Air Trends*, *supra* note 9. For an analysis of the non-cancer effects of acrolein, see U.S. EPA, Nat'l Air Toxics Network, *The National-Scale Air Toxics Assessment*, *at* http://www.epa.gov/ttn/atw/nata (last updated Sept. 18, 2002). In addition, animal testing reveals that acrolein is potentially carcinogenic to humans. *See* U.S. EPA, OFFICE OF TRANSP. & AIR QUALITY, TECHNICAL SUPPORT DOCUMENT: CONTROL OF EMISSIONS OF HAZARDOUS AIR POLLUTANTS FROM MOTOR VEHICLES AND MOTOR VEHICLE FUELS 51 (2000), *available at* http://www.epa.gov/otaq/regs/toxics/r00023.pdf [hereinafter EPA, MOTOR VEHICLE HAPS]. According to EPA, acrolein also has chronic and acute adverse health effects. *Id.* In some rural areas, acrolein also may present a leading human health risk from environmental pollutants. *See, e.g.*, Envtl. Def., *Scorecard* (ranking acrolein as the leading carcinogen in Cannon County, Tennessee), *at* http://www.scorecard.org/env-releases/hap/county.tcl? fips_county_code=47015#rankings (last visited Jan. 27, 2005).

[41] EPA, MOTOR VEHICLE HAPS, *supra* note 40, at 51.

[42] Individuals emitted 3294.8 tons of acrolein in 1996 from mobile sources alone. *See* U.S. EPA, OFFICE OF TRANSP. & AIR QUALITY, THE PROJECTION OF MOBILE SOURCE AIR TOXICS FROM 1996 TO 2007: EMISSIONS AND CONCENTRATIONS 23 tbl.5 (2001) (EPA 420-R-01-038), *available at* http://www.epa.gov/otaq/regs/toxics/r01038.pdf [hereinafter EPA, MOBILE SOURCE PROJECTION]. In contrast, the industrial facilities subject to TRI reporting released forty-one tons in 1996. *See* U.S. EPA, OFFICE OF ENVTL. INFO., TRI EXPLORER DATABASE (1996), *available at* http://www.epa.gov/triexplorer/chemical.htm (last visited June 10, 2004) [hereinafter EPA, 1996 TRI EXPLORER DATABASE]. For this analysis, only the vehicles likely to be used by private individuals were included. For on-road vehicles, only cars and light duty trucks (e.g., pick-up trucks and sport utility vehicles) were included, not medium or heavy-duty trucks. Cars and light duty trucks not operated by private individuals (e.g., cars used for commercial purposes and delivery vans) were excluded. *See* Vandenbergh, *supra* note 3, at 547 n.116 (noting that private individuals operate 76.3% of all cars, 82.5% of all light trucks, and a large percentage of non-road motor vehicles). The individual total does not include releases from other individual behaviors, such as wood-burning stove use. *See* U.S. EPA, TOXICOLOGICAL REVIEW OF ACROLEIN: IN SUPPORT OF SUMMARY INFORMATION ON THE INTEGRATED RISK INFORMATION SYSTEM 4 (2003). Area sources (e.g., small businesses) also release substantial quantities of acrolein. *See* EPA, MOBILE SOURCE PROJECTION, *supra*, at 23 tbl.5 (presenting data suggesting that the motor vehicle total constitutes 10.5% of all emissions).

[43] *See* Charles Rodes et al., Measuring Concentrations of Selected Air Pollutants Inside California

Thus, the driver imposes the risks of acrolein emissions not on himself but on those who breathe the air down-wind from the vehicle. In addition, many would find it inconvenient to drive less. As a result, the payoff to the driver of behavior changes that reduce acrolein emissions often is negative. In addition, motor vehicle use often occurs on highways and in other classic loose-knit group situations, in which opportunities for social sanctions are limited.[44] As with many dioxin-releasing behaviors, rational actors, when confronted with information about their acrolein emissions, are not expected to change behavior.

3. The Challenge of Personal Norms.—The norms literature provides only limited insights for the resolution of negative-payoff, loose-knit group situations. Recent studies of two types of efforts that rely on norms to influence environmental behaviors, recycling norm campaigns and labeling programs, demonstrate the difficulty of changing behavior in these situations.[45] In addition, the more general legal literature on norms is extensive, but the bulk of the scholarship has focused on the role of externally-enforced social norms, which have limited influence in loose-knit group situations. For example, Eric Posner has focused almost exclusively on social norms and has proposed a signaling theory to explain their origin and function.[46] Several scholars have emphasized the importance of personal norms[47] and have argued that personal norms do influence behavior in some

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Vehicles, Final Report, ARB Contract No. 95-339, at xi–xii (Dec. 1998) (unpublished manuscript) (concluding that concentrations of several air pollutants are higher inside vehicles than outside, and that the source of the air pollutants is other vehicles), *available at* http://www.arb.ca.gov/research/indoor/invehsm.htm.

[44] *See, e.g.*, Lior Jacob Strahilevitz, *How Changes in Property Regimes Influence Social Norms: Commodifying California's Carpool Lanes*, 75 IND. L.J. 1231, 1240–43 (2000) (describing characteristics of driving situations). In many cases, the driver of a vehicle may be in more of an intermediate-knit group situation: She may not have iterative relationships with other drivers, but she may have such relationships with passengers in the vehicle (e.g., family members, friends, or co-workers). *See* Strahilevitz, *Loose-Knit Groups*, *supra* note 2, at 360. These types of situations suggest that the social norm effects that flow from personal norm activation may be greater for automobile use than a loose-knit group assumption would suggest.

[45] *See* discussion *infra* notes 131–146. Several legal scholars have discussed littering, *see, e.g.*, McAdams, *supra* note 2, at 353; Sunstein, *supra* note 2, at 909, but littering typically does not involve the release of toxics, the focus of this Article, and littering is markedly less important for long-term environmental quality than the behaviors discussed here.

[46] POSNER, *supra* note 2, at 43; Eric A. Posner, *Law and Social Norms: The Case of Tax Compliance*, 86 VA. L. REV. 1781, 1788 (2000) (asserting that personal norms are not valuable for explaining or predicting behavior).

[47] *See* Robert D. Cooter, *Structural Adjudication and the New Law Merchant: A Model of Decentralized Law*, 14 INT'L REV. L. & ECON. 215, 218 (1994); Richard H. McAdams, *Signaling Discount Rates: Law, Norms, and Economic Methodology*, 110 YALE L.J. 625, 627 (2001) (reviewing POSNER, *supra* note 2). Even the norms theorists in the legal literature who have noted the importance of personal norms, however, have focused much of their attention on the relationship between personal norms and social norm enforcement. *See* McAdams, *supra* note 2, at 377–84.

types of loose-knit group situations.[48] Yet the identification of the most influential norms for particular behaviors, the means by which personal norms become influential, and the ways in which legal interventions can affect this process have received only limited attention.

The focus on social rather than personal norms in the legal literature is understandable. Norms theorists typically seek to expand but not to abandon the rational choice analysis that has dominated much of legal scholarship over the last several decades.[49] At least in theory, the rational choice approach can accommodate social norms by adding the costs and benefits arising from social norm enforcement to the factors included in an individual's utility calculus.[50] Personal norms present a far more difficult challenge. As Robert Scott has argued, if personal norms influence behavior but are unstable, "then the rational choice analyst must treat [them] as endogenous or abandon any pretense of having a fully predictive model."[51] Further problems arise if personal norms are heterogeneous within the target population.[52] In fact, personal norms raise each of these concerns: They are likely to be influential, yet changeable and heterogeneous. Thus, the choice seems to be between throwing in the towel on understanding and effectuating personal norm-driven behavior change in negative-payoff, loose-knit group situations altogether, and developing laws and policies that may influence personal norms without the guidance of predictive models.

I suggest that we may be expecting too much too soon from norms theory, and in the process may be missing opportunities to develop theories that generate falsifiable hypotheses and viable legal reforms for important categories of behavior. Instead of seeking to develop universal models that account for all personal norm effects or ignoring personal norms altogether, I follow a more inductive approach that tailors norms theory to specific clusters of behaviors and periods of time, and allows for rigorous testing of its predictive capacity for these behaviors and time periods.[53] This approach

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[48] For example, norms regarding handicapped parking are the subject of vigorous social enforcement. Miller, *supra* note 2, at 897; *see also* Sunstein, *supra* note 2, at 905 (discussing littering).

[49] *See* McAdams, *supra* note 2, at 377.

[50] *See* discussion *supra* note 32.

[51] Robert E. Scott, *The Limits of Behavioral Theories of Law and Social Norms*, 86 VA. L. REV. 1603, 1622 n.39 (2000) (referring to values and preferences). As Elinor Ostrom has noted, "the currently accepted explanation from noncooperative game theory relying on a particular model of the individual that assumes a close relation between monetary payoffs and utility does not adequately predict or explain findings from *N*-person laboratory experiments." Ostrom, *supra* note 29, at 38. Yet critics have asserted that norms theories that incorporate personal norm effects are unable to generate falsifiable predictions. *See* POSNER, *supra* note 2, at 43 (concluding that "no well-developed theory of guilt allows us to make predictions about when" it will be influential or "what kinds of people feel guilt and what kinds of people do not. So . . . we cannot rely on a theory of guilt for an explanation.").

[52] *See* Ostrom, *supra* note 29, at 25, 64 n.3 (identifying "core assumptions" of the rational choice model used in economic theory).

[53] *See, e.g.*, HUIB PELLIKAAN & ROBERT J. VAN DER VEEN, ENVIRONMENTAL DILEMMAS AND POLICY DESIGN 147 (2002) (reporting results of an empirical study suggesting that individuals' prefer-

assumes that in many cases personal norms are sufficiently stable and widespread to enable valuable predictions to be made about individual behavior for extended periods of time and for large segments of the population. The approach requires a generalized mechanism of norm activation combined with the identification of specific norms and beliefs for various behaviors.[54]

B. *The Activation of Personal Norms*

In this Part, I draw on the concept of norm activation in the social psychology literature to develop a theory of environmental norm activation, and I apply the theory to the toxics-releasing behaviors of private individuals. The theory integrates and extends the types of norms and norm triggering concepts advanced by legal norms theorists and the leading work in the social psychological literature.[55]

1. Legal and Social Psychological Foundations.—Norms theorists in the legal literature have asserted that individuals hold specific, first-order or concrete norms, as well as generalized, second-order or abstract norms.[56] These internalized, personal norms are enforced by guilt and related emotions.[57] For example, Robert Cooter has argued that individuals may hold a specific, first-order preference for milk, behind which is a more abstract,

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ences differ based on the type of collective action problem presented); McAdams, *supra* note 47, at 627 (concluding that "the value often comes directly from Posner's thinking about the specific issue rather than from applying his conceptual apparatus"). The profusion of untested theories regarding the role of social influence is not limited to the legal literature. *See, e.g.*, Paul C. Stern et al., *A Value-Belief-Norm Theory of Support for Social Movements: The Case of Environmentalism*, 6 HUM. ECOLOGY REV. 81, 85 (1999) (noting that as of the late 1990s social scientists had developed at least six theories of the origins of environmentalism but had not conducted empirical studies to compare their predictive capacity); *cf.* Gregory Mitchell, *Why Law and Economics' Perfect Rationality Should Not Be Traded for Behavioral Law and Economics' Equal Incompetence*, 91 GEO. L.J. 67, 75 (2002) (suggesting that the "evidence of individual and situational differences in rationality counsels rejection of a simple dichotomous choice between universal rationality and universal irrationality and directs attention instead to comparisons of the relative predictive power of the two models in specific domains for specific groups of people").

[54] Although norms theorists in the legal literature have only offered limited explanations of how laws may influence behavior by influencing personal norms, a more thorough understanding of the mechanism of action is necessary for the development of hypotheses about norm influences on behavior and legal reforms. *See* Michael P. Vandenbergh, *Beyond Elegance: A Testable Typology of Social Norms in Corporate Environmental Compliance*, 22 STAN. ENVTL. L.J. 55, 71–72 (2003); *cf.* Alex Geisinger, *A Belief Change Theory of Expressive Law*, 88 IOWA L. REV. 35, 55 (2002) (noting that "[c]urrent theories of expressive law have been criticized as . . . failing to provide a mechanism by which law can be predicted to have an expressive effect").

[55] The theory I develop here is tailored to negative-payoff, loose-knit group environmental behaviors, but the general methodology is applicable to many other types of behavior. *See* discussion *infra* notes 225–226.

[56] *See* Cooter, *supra* note 2, at 1595–96 (referring to first-order and second-order preferences); McAdams, *supra* note 2, at 382–84 (referring to concrete and abstract norms).

[57] *See* McAdams, *supra* note 2, at 382–84 (noting that some concrete norms are internalized and that others are only enforced by social sanctions and rewards).

second-order preference for health.[58] Legal norms theorists also have proposed that the linkage between the second- and first-order norms often is the set of beliefs about what actions tie second-order to first-order norms. For example, Richard McAdams has proposed that new information about child safety or enactment of a law regarding child safety may tie the abstract norm of "be a good parent" to the concrete norm in favor of child safety seat use.[59] Although legal scholars have identified how particular personal norms influence particular behaviors and how norms are internalized, they have given little attention to a more systematic identification of the norms that influence categories of behavior and to the mechanisms by which changes in beliefs trigger existing personal norms.[60] They also have focused much of their attention on the expressive effects of law on norms, while giving limited attention to the ability of laws to influence beliefs directly by requiring information disclosure.[61]

The social psychology literature has proceeded on a parallel track, but it offers a generalized theory of the types of beliefs that are likely to affect personal norms. In particular, Paul Stern and colleagues have drawn on the work of Shalom Schwartz to propose a Values-Beliefs-Norms ("VBN") theory. The VBN theory suggests that pro-environmental behavior is influenced by the interaction of values, beliefs, and norms. The VBN theory incorporates findings of empirical studies indicating that most individuals hold at least four value clusters, each of which includes more specific values.[62] A new belief that a value is threatened and that the individual can act to reduce the threat tends to activate norms and induce action.[63] The VBN

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[58] Cooter, *supra* note 2, at 1595–96; *see also* Cooter, *supra* note 47, at 220–21.

[59] *See* McAdams, *supra* note 2, at 407–08. For an early exploration of the role of norms in environmental behavior, see Carol M. Rose, *Rethinking Environmental Controls: Management Strategies for Common Resources*, 1991 DUKE L.J. 1, 29–36.

[60] As Robert Cooter has suggested, "[t]o understand the interaction between law and norms, social scientists should describe the distribution and effects of internalized values." Cooter, *supra* note 2, at 1580. My focus in this Article is on identifying the "internalized values" or personal norms relevant to environmental behavior and the belief changes that predict the effects of these norms. For an exception to the general lack of focus among norms scholars on the effects of belief change on norms, see Geisinger, *supra* note 54.

[61] *See, e.g.*, McAdams, *supra* note 2, at 400 (suggesting that "[i]f the esteem theory is correct, it suggests two specific ways that statutes create and strengthen norms: (1) lawmaking publicizes a societal consensus, and (2) law provides the concrete norms that define compliance with internalized abstract norms").

[62] *See* Shalom H. Schwartz, *Are There Universal Aspects in the Structure and Contents of Human Values?*, 50 J. SOC. ISSUES 19, 46 (1994); Paul C. Stern, *Information, Incentives, and Proenvironmental Consumer Behavior*, 22 J. CONSUMER POL'Y 461, 463 (1999) (citing Shalom H. Schwartz, *Universals in the Content and Structure of Values: Theoretical Advances and Empirical Tests in 20 Countries*, 25 ADVANCES EXPERIMENTAL SOC. PSYCHOL. 1, 65 (1992) [hereinafter Schwartz, *Tests in 20 Countries*]). The conclusions of Schwartz's empirical studies are consistent with Dan Kahan's assertion regarding the heterogeneity of collective action dispositions. *See* Dan Kahan, *The Logic of Reciprocity: Trust, Collective Action, and Law*, 102 MICH. L. REV. 71, 78 (2003).

[63] *See, e.g.*, Stern et al., *supra* note 53, at 83–85. For a discussion of the concept of a personal norm

theory provides a generalized mechanism for norm activation through belief change, and it accounts for external constraints on behavior, but it does not address the legal influences on belief change.[64]

2. Norm Activation for Environmental Behavior.—The environmental norm activation theory I develop here integrates the insights of the VBN theory with legal norms theory to explain individual environmental behaviors that arise in negative-payoff, loose-knit group situations. I focus in particular on toxics-releasing behaviors. I assume that individuals are rational actors who account for both material and psychological costs and benefits in their decisionmaking.[65]

a. Abstract norms.—Many individuals share a common set of abstract, second-order personal norms.[66] These abstract norms are stable for extended periods of time.[67] I include in the environmental norm activation theory two norms that empirical studies suggest are widely held, stable, and likely to influence individuals' environmental behavior in negative-payoff, loose-knit group situations: environmental protection and reciprocity.[68]

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as used in the VBN theory, see *id.* at 92 (quoting Shalom Schwartz). The principal alternative theories of behavior in the social psychology literature are the Theory of Reasoned Action and the Theory of Planned Behavior. *See* Geisinger, *supra* note 54, at 55–62; Vandenbergh, *supra* note 54, at 77 n.64. These theories differ from the VBN theory in that they do not explicitly account for altruistic as opposed to egoistic or individualistic values, and they do not utilize norm activation. *See* Stern, *supra* note 62, at 463. The use of norm activation in the VBN theory is particularly important for a behavior that does not have a tangible personal benefit for the individual. *Id.*

[64] Social psychological theories tend to focus on the decisionmaking process but not on external influences, while legal theories tend to focus on external influences but not on the decisionmaking process. *See* Gregory A. Guagnano et al., *Influences on Attitude-Behavior Relationships: A Natural Experiment with Curbside Recycling*, 27 ENV'T & BEHAV. 699, 699–700 (1995); Posner, *supra* note 46, at 1781 (concluding that "[t]he main problem is that there has been no convergence on methodology, and the result of this is, on the one hand, a large number of ideas that do not cohere and are thus difficult to evaluate, and, on the other hand, too much scholarship that is abstract and methodological rather than devoted to understanding particular problems of law and social behavior").

[65] *See, e.g.*, Ostrom, *supra* note 29, at 39–40 (assuming individuals are "rational in a broad sense . . . that they seek to improve values of importance to them (including what happens to other individuals who are of concern to them)").

[66] Not all individuals hold the same abstract norms, but empirical studies suggest that many are shared widely enough to enable the theory to be valuable for predicting the behavior of substantial portions of the population. I follow the VBN theory in drawing on the empirical studies of Shalom Schwartz regarding widespread abstract norms. *See* Stern, *supra* note 62, at 463.

[67] *See* McAdams, *supra* note 2, at 383. The law may play a role in inducing internalization of new abstract norms or modification of existing ones, but I do not include the formation or modification of abstract norms in the norm activation theory. Over the long term, attempts to create or shift abstract norms (e.g., through school curricula) are important, but the empirical studies discussed *infra* demonstrate that the two principal abstract norms that are important for negative-payoff, loose-knit group environmental behavior change already exist in large segments of the population and have existed for an extended period, thus policymakers need not seek to create them. Instead, behavior change at this point may be more likely to arise from belief change that induces concrete norm activation or creation.

[68] *See* discussion *infra* notes 71–80. In contrast to the two norms I include in the norm activation theory, the VBN theory refers to abstract norms as values and includes four "value clusters." *See* Stern

These are not the only abstract norms that influence negative-payoff, loose-knit group environmental behaviors. A range of other norms, including norms regarding autonomy and law compliance, certainly are important, but the environmental protection and reciprocity norms each address a critical aspect of the problem created by negative-payoff, loose-knit group situations. In particular, the environmental protection norm addresses the negative payoff by generating a sense of obligation to act in the individual even absent other social, legal, or economic incentives.[69] The reciprocity norm addresses the disincentives for action that arise in loose-knit group situations by ensuring that individuals who feel an initial sense of obligation to act do not fail to do so because they fear that they will be a "sucker."[70]

(1) The environmental protection norm.—Studies suggest that an abstract norm favoring protection of human health and the environment is widely held, stable, and influential.[71] Individuals' actions are certainly not always consistent with the environmental protection norm, but opinion polls have detected widespread support for the norm for more than thirty

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et al., *supra* note 53, at 83–87 (identifying altruistic, egoistic, traditional and openness to change value clusters). The value clusters of the VBN theory are expressed at a level of generality (e.g., altruism or egoism) not necessary here. The specific values operationalized in empirical tests of the VBN theory, however, correspond roughly to the abstract, second order norms identified in the legal literature. *See, e.g.*, *id.* app. at 95 (including "protecting the environment" and "conserving natural resources" in the altruistic value cluster); *see also id.* app. at 95–96 (listing specific questions regarding toxics on the topics of AC, concrete personal norms, and consumer behavior). The norm activation theory proposed here begins with the environmental norms alone and does not incorporate the assumption that the environmental norms cluster with other "altruistic norms." In addition, the VBN theory presumes that the "New Ecological Paradigm" ("NEP") influences norm activation, *see id.* app. at 85, but studies suggest that the inclusion of the NEP adds little to the theory, and I have not included it in the norm activation theory. Stern and colleagues did not ask toxics-focused questions about abstract norms, AR, willingness to sacrifice, or environmental citizenship. *Id.*

[69] *See* Carlson, *supra* note 2, at 1250 (noting that "[a]n independent social norm in favor of resolution of the collective action problem may also be necessary to motivate individual cooperative behavior").

[70] *See* Ostrom, *supra* note 29, at 40–41 (noting the influence of an individual believing that she is a "sucker" in public dilemma situations).

[71] Numerous studies suggest that a substantial majority of the population holds the environmental protection norm. *See* RILEY E. DUNLAP ET AL., HEALTH OF THE PLANET 83 tbl.15 (1993); NAT'L ENVTL. EDUC. & TRAINING FOUND. & ROPER STARCH WORLDWIDE, ENVIRONMENTAL READINESS FOR THE 21ST CENTURY: THE EIGHTH ANNUAL NATIONAL REPORT CARD ON ENVIRONMENTAL ATTITUDES, KNOWLEDGE, AND BEHAVIOR 27 (David Lintern ed., 1999) [hereinafter NEETF, 1999 REPORT CARD]. The environmental protection norm can be thought of as a norm of cooperation for situations in which human health or environmental quality is threatened, and thus is roughly analogous to the "neighborliness" norm identified by Ellickson among ranchers and farmers in Shasta County, California. *See* ELLICKSON, *supra* note 1, at viii. Many individuals will initiate an interaction or response to a social dilemma with a cooperative act, and some scholars include this as an element of a reciprocity norm, in essence suggesting that a component of reciprocity is the notion that an individual will cooperate first, then evaluate whether continued cooperation will be reciprocated. *See* Ostrom, *supra* note 29, at 46 (describing a version of the norm as "[a]lways cooperate first; stop cooperating if others do not reciprocate; and punish noncooperators if feasible").

years.[72] Empirical studies also suggest that the norm influences behavioral intentions and behaviors.[73] Although support for protection of human health from environmental threats differs from support for protection of ecosystems and other species in some cases,[74] the differences for the purposes of toxic chemical releases often are insignificant, and I treat individuals' sense of obligation to protect human health and the environment as a single "environmental protection norm" throughout the remainder of the Article.

(2) The reciprocity norm.—A number of studies also suggest that many individuals hold a stable, influential abstract reciprocity norm.[75] Although the reciprocity norm has been defined in many ways, the legal, philosophical, and social science literatures have all ascribed to the concept that an individual often will cooperate more than narrow rational actor

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[72] The percentage of individuals who favor greater environmental protection grew sharply in the 1960s. *See, e.g.*, Hazel Erskine, *The Polls: Pollution and Its Costs*, 36 PUB. OPINION Q. 120, 120 (1972) (noting that respondents expressing support for greater environmental spending increased from roughly 30% in 1965 to 59% in 1971). Although the numbers have fluctuated throughout the following three decades, and the form of the questions has varied, the percentage of respondents professing support for environmental protection throughout this period has remained high. DUNLAP ET AL., *supra* note 71, at 83 tbl.15; Denton E. Morrison & Riley E. Dunlap, *Environmentalism and Elitism: A Conceptual and Empirical Analysis*, 10 ENVTL. MGMT. 581, 581–89 (1986); *see also* Shalom Schwartz, *Tests in 20 Countries*, *supra* note 62 (reviewing results of empirical studies on worldwide distribution of values).

[73] *See* sources cited *infra* notes 83–86; *see also* Riley E. Dunlap & Kent D. Van Liere, *Land Ethic or Golden Rule: Comment on "Land Ethic Realized" by Thomas A. Heberlien*, 33 J. SOC. ISSUES 200, 205 (1977) (identifying the importance of the Golden Rule to environmental behavior); Brenda L. Flannery & Douglas R. May, *Environmental Ethical Decision Making in the U.S. Metal-Finishing Industry*, 43 ACAD. MGMT. J. 642, 653–54, 657 (2000) (presenting vignettes to business managers and concluding that the magnitude of the harms caused influenced their intentions).

[74] *See* Dunlap & Van Liere, *supra* note 73, at 204–05; Thomas A. Heberlein, *A Rejoinder to R.E. Dunlap and K.D. Van Liere*, 33 J. SOC. ISSUES 207, 208 (1977); Thomas A. Heberlein, *The Land Ethic Realized: Some Social Psychological Explanations for Changing Environmental Attitudes*, 28 J. SOC. ISSUES 79 (1972) [hereinafter Heberlein, *Land Ethic Realized*]; P. Wesley Schultz & Lynnette Zelezny, *Values as Predictors of Environmental Attitudes: Evidence for Consistency Across 14 Countries*, 19 J. ENVTL. PSYCHOL. 255, 257 (1999) (concluding that there is "only limited support" for a set of environmental attitudes that are distinct from attitudes about human welfare); Stern et al., *supra* note 53, at 85 (concluding that "the distinction between altruism towards humans and altruism towards other species and the biosphere has not yet been demonstrated empirically in samples of the U.S. general public").

[75] *See* Kahan, *supra* note 62, at 72–80 (distinguishing "weak reciprocators" from "strong reciprocators" and noting that strong reciprocators "will condition their contributions to collective goods on the contributions of others even in fleeting transactions with multiple actors whose behavior they cannot keep track of and whose identities they can't even discern"); Ostrom, *supra* note 29, at 42 (noting that "[a]ll reciprocity norms share the common ingredients that individuals tend to react to the positive actions of others with positive responses and to the negative actions of others with negative responses"). Other closely related concepts have been described as a cooperation norm, *see* Carlson, *supra* note 2, at 1289, 1291, and a fairness norm. *See* Cooter, *supra* note 2, at 1579 (describing the norm as "treating others fairly"); Christine Jolls et al., *A Behavioral Approach to Law and Economics*, 50 STAN. L. REV. 1471, 1493 (1998) (noting that "[a] concern for fairness is part of most agents' utility function"); Korobkin & Ulen, *supra* note 32, at 1136 (concluding that "the evidence suggests that, for many people, self-interest maximization can be somewhat tempered by the affirmative desire to treat others fairly").

models predict if the individual believes that others are cooperating or will cooperate.[76] Empirical studies of collective goods problems have demonstrated the influence of the reciprocity norm.[77] These studies suggest that individuals will contribute to collective goods if they believe that doing so represents doing their fair share. To avoid being taken advantage of, however, they will stop cooperating if they perceive that others are not reciprocating.[78] For example, although an altruist might refrain from watering her lawn in a drought and might increase her conservation efforts if others are not doing so, studies in Southern California have demonstrated that water conservation occurs most often when individuals believe that others also are conserving.[79] I refer to individuals' sense of obligation to do their fair share if they believe that others have done or will do so as the abstract reciprocity norm.[80]

b. Concrete norms.—In addition to abstract norms, the legal and social psychological literatures suggest that individuals hold a wide range of more specific concrete personal norms that relate to the abstract norms. These concrete norms include a number that are important for environmental behavior.[81] For example, the notions that individuals have an obligation to refrain from pouring toxic chemicals into a stream or killing bald

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[76] *See, e.g.*, Ostrom, *supra* note 29, at 42 (noting that "[r]eciprocity is viewed by sociologists, social psychologists, and philosophers as one of the basic norms taught in all societies").

[77] *See* Carlson, *supra* note 2, at 1247–50 (reviewing results of studies); Ostrom, *supra* note 29, at 49 (noting conditions under which cooperation can be increased). A difficulty of relying on many empirical studies to assume that individuals will act consistently with the reciprocity norm is that cooperation appears to be most common in small group settings in which communication among group members is possible. Nevertheless, surprisingly high levels of cooperation appear to occur, at least initially, even in situations in which individuals interact only once or cannot communicate. Ostrom, *supra* note 29, at 38. The cooperative behavior often falls off substantially over time if individuals cannot communicate, *see* Carlson, *supra* note 2, at 1247, and the drop-off appears to occur because of a belief that others are not reciprocating. RICHARD THALER, THE WINNER'S CURSE: PARADOXES & ANOMALIES OF ECONOMIC LIFE 14 (1992). A recent Dutch empirical study suggests, however, that even in loose-knit group situations many individuals will change some environmental behaviors, including several important for toxic chemical releases, if they believe that many others will do the same. *See* PELLIKAAN & VAN DER VEEN, *supra* note 53, at 205–06.

[78] As Dan Kahan has noted, people will "contribute their fair share to securing collective goods. By the same token, most individuals loathe being taken advantage of. Accordingly, if they perceive that most other individuals are shirking, they too hold back to avoid feeling (or being) exploited." Kahan, *supra* note 62, at 73; *see also* Ostrom, *supra* note 29, at 46.

[79] *See* Strahilevitz, *Loose-Knit Groups*, *supra* note 2, at 360; *see also* Carlson, *supra* note 2, at 1289–90 (noting that the success of feedback mechanisms may arise because of the "norm of cooperation").

[80] The concept of fairness is closely related to the abstract reciprocity norm. *See, e.g.*, McAdams, *supra* note 2, at 384 (describing "do one's share" as a widely-held abstract norm).

[81] The personal norms of the VBN theory correspond quite closely to concrete, first order norms. *See* Stern et al., *supra* note 53, at 85 (describing personal norms as "a sense of moral obligation that creates a predisposition to act").

eagles or other endangered species are widely (although not universally) held.[82]

c. Norm activation.—Linking abstract norms and concrete norms is the set of beliefs about what actions implicate the abstract norms, and either activate existing concrete norms by tying them to abstract norms, or create new concrete norms.[83] Norm activation thus provides the mechanism by which norms influence behavioral intentions and behavior.[84] To activate a concrete norm, an individual must hold two types of beliefs. First, she must be aware of the consequences of her act regarding the objects of an abstract norm (commonly referred to as "AC"). For example, a study of backyard burning asked whether the respondents believed that the smoke from backyard burning made it difficult for people to breathe.[85] Second, she must take personal responsibility for causing or preventing those consequences (commonly referred to as "AR"). The backyard burning study evaluated AR by asking whether the respondents believed that it

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[82] *See, e.g.*, J. Stanley Black et al., *Personal and Contextual Influences on Household Energy Adaptations*, 70 J. APPLIED PSYCHOL. 3, 17–18 (1985) (postulating different concrete norms for energy efficiency and curtailment, and distinguishing "personal norms" (e.g., a "sense of personal obligation and pride with respect to insulating the home and getting the same comfort for less energy," and a "sense of obligation to 'cut back' or to use less heat in winter") from "social norms" (e.g., a "belief that neighbors disapprove of overuse of home heating or cooling")); Sherman J. Clark, *The Courage of Our Convictions*, 97 MICH. L. REV. 2381, 2394 (1999) (discussing wildlife protection values or norms); Paul C. Stern et al., *Support for Environmental Protection: The Role of Moral Norms*, 8 POPULATION & ENV'T 204, 220 (1995) (concluding that awareness of consequences regarding the effects of toxics can activate a norm).

[83] Social psychological studies of several environmental behaviors have supported the norm activation concept. *See, e.g.*, J. Stanley Black, Attitudinal, Normative and Economic Factors in Early Response to an Energy-Use Field Experiment 274 (1978) (unpublished Ph.D. dissertation, University of Wisconsin) (available at Dissertation Abstracts International, 39, 436B) (concluding that "the norm-activation model is strongly supported, with personal norm, awareness of consequences, and the belief in the energy crisis having major impacts on intentions to conserve peak-period electricity"); Gary A. Guagnano et al., *Willingness to Pay for Public Goods: A Test of the Contribution Model*, 5 PSYCHOL. SCI. 411, 415 (1994) (concluding that willingness to pay for environmental amenities is influenced by awareness of consequences of environmental harm, but not if the payment is framed as a tax); Stern, *supra* note 62, at 469 (concluding that a pro-environmental norm accounted for 11% of the variation in energy conservation activities, whereas price accounted for 2%); Stern et al., *supra* note 53, at 85; Stern et al., *supra* note 82, at 220; Paul C. Stern et al., *Value Orientations, Gender, and Environmental Concern*, 25 ENVTL. BEHAV. 322, 348 (1993); Kent D. Van Liere & Riley E. Dunlap, *Moral Norms and Environmental Behavior: An Application of Schwartz's Norm-Activation Model to Yard Burning*, 8 J. APPLIED SOC. PSYCHOL. 174, 187 (1978) (concluding, in a study of yard brush burning, that those who believe that burning causes adverse human health effects (AC) and who believe they can reduce those effects (AR) are less likely to burn than others).

[84] I follow the VBN theory here in drawing on the work of Shalom Schwartz. *See* Shalom H. Schwartz, *Moral Decision Making and Behavior*, *in* ALTRUISM AND HELPING BEHAVIOR (J. MacCauley & L. Berkowitz eds., 1970); Schwartz, *supra* note 16, at 222.

[85] *See* Van Liere & Dunlap, *supra* note 83, at 180, 187 (examining AC for the norm of "respect for the health of others" by asking "[s]ome people say that the smoke from backyard burning makes it difficult for people with respiratory problems to breathe. Do you agree or disagree?"); *see also* Stern et al., *supra* note 53, at 96 (asking whether "toxic substances in air, water and soil" pose a "serious problem" for "you and your family," for "the country as a whole," or for "other species of plants and animals").

was difficult or costly to avoid backyard burning.[86]

Thus, for an individual who holds an abstract personal norm, the theory suggests that changes in beliefs concerning AC and AR relevant to the abstract norm will activate a concrete personal norm, producing a sense of duty to act consistently with the concrete norm and guilt if the norm is violated.[87] The sense of duty to act may arise even in the absence of a perceived likelihood of external social sanctions.[88] Of course, by changing the perceived likelihood of norm enforcement by others or by changing beliefs about the certainty of information, the norm-activating information also may increase or decrease the influence of social norms.[89]

Once activated, the sense of obligation arising from the concrete personal norm will then lead to the formation of a behavioral intention, which will induce the individual to behave in a particular way if other constraints do not impede action.[90] These constraints, ranging from the financial costs of behavior change (e.g., purchasing a less polluting car), to the physical ef-

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[86] Van Liere & Dunlap, *supra* note 83, at 179–80 (examining AR by asking for agreement or disagreement with the statement that "[s]ome people say that backyard burning should be allowed because many people are not able to take wastes to the dump and cannot afford to have them hauled to the dump"); *see also* Stern et al., *supra* note 53, at 83 (noting that AR refers to "the belief or denial that one's own actions have contributed to or could alleviate those consequences"). Van Liere and Dunlap also asked whether the share of the harm from backyard burning was small compared to the share contributed by other sources, but I analyze the relative contribution of individual behavior as compared to other sources when evaluating reciprocity norm activation, not environmental protection norm activation. *See* Van Liere & Dunlap, *supra* note 83, at 180 (asking for response to the statement that "Some people say backyard burning should be allowed because the amount of pollution it causes is very small compared to other sources such as automobiles"). Although the term "ascription of responsibility" is commonly used in the literature, Schwartz indicated that "responsibility denial" is a preferable term for the concept, since the latter term emphasizes the defensive nature of the concept. In other words, the concept refers to the tendency to deny responsibility for an act after the fact, rather than to "a spontaneous tendency to see the self as responsible for events initially." Schwartz, *supra* note 16, at 230 n.4. Nevertheless, his work has been widely viewed as including AC and AR as the two factors that activate norms. *See id.* at 277.

[87] Although the norm activated is a particular concrete norm related to a more general abstract norm, to simplify the description of the process in the Article I often refer to activation of the abstract norm (e.g., I refer to activation of the environmental protection norm). For a discussion of norm activation in the legal literature, see Vandenbergh, *supra* note 54, at 63, 76–78.

[88] *See* Paul C. Stern, *Toward a Coherent Theory of Environmentally Significant Behavior*, 56 J. SOC. ISSUES 407, 412 (2000).

[89] For a discussion of the relationship between personal norms and perceived norm enforcement, see McAdams, *supra* note 31, at 1720. Measures that make a norm more salient when individuals form behavioral intentions also may be important. *See* Robert B. Cialdini et al., *A Focus Theory of Normative Conduct: Recycling the Concept of Norms to Reduce Littering in Public Places*, 58 J. PERSONALITY & SOC. PSYCHOL. 1015, 1015 (1990) (discussing the importance of the individual's focus on norms or their salience).

[90] I follow the approach of the VBN theory in accounting for other constraints on behavior. *See* Stern et al., *supra* note 53, at 86. For an example of a study evaluating the effects of economic constraints, see, for example, Black et al., *supra* note 82, at 17 (noting that norms have a greater influence on behaviors that are not economically constrained (e.g., reducing the temperature setting on a thermostat), than those that are (e.g., investing in a new furnace)).

fort required for the behavior (e.g., walking to a bus stop), to the social costs (e.g., the inability to signal social status with a large, high-polluting vehicle), in many cases will be substantial. I distinguish between behaviors that have a direct effect on the environment, such as backyard burning or driving, and behaviors that have an indirect effect on the environment through their influence on government action, such as voting or working for a ballot initiative to fund mass transit. I call the former direct environmental behavior and the latter civic behavior.[91] In many cases, the impediments to changing direct environmental behavior will be greater than those for civic behavior; thus, civic effects may be more common than direct environmental effects.[92]

Norm activation theory informs legal theory by identifying the types of belief change that legal interventions must accomplish to activate norms. In particular, norm activation theory suggests that beliefs must be changed concerning the awareness of consequences and acceptance of responsibility relevant to a particular abstract personal norm. Legal theorists have argued that the law can change beliefs in at least two ways. First, the enactment of a law can change beliefs about the nature of the underlying social problem addressed (e.g., a smoking ban may change beliefs about the human health effects of smoking). Second, the enactment of a law can change beliefs about the existence of a social consensus regarding the problem (and thus increase the perceived likelihood of social and legal sanctions for certain

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[91] Studies suggest that even in cases where individuals' belief change and norm activation does not induce changes in environmental behavior such as consumer choices, it may induce changes in civic behavior. Black et al., *supra* note 83, at 17 (survey of residential electric customers suggested that although awareness of the social and environmental consequences of energy conservation increases personal curtailment of energy use, it does not influence investments in energy efficient equipment); Stern et al., *supra* note 53, at 91. If individuals place energy conservation in the civic category and equipment purchases in the consumer category, this finding may be consistent with the citizen-consumer distinction, which has been discussed at length in the legal literature. *See* Daphna Lewinsohn-Zamir, *Consumer Preferences, Citizen Preferences and the Provision of Public Goods*, 108 YALE L.J. 377 (1998); Mark Sagoff, *Economic Theory & Environmental Law*, 79 MICH. L. REV. 1393, 1398 (1981); Cass R. Sunstein, *Preferences & Politics*, 20 PHIL. & PUB. AFF. 3 (1991). In empirical tests of the VBN theory, Stern and colleagues have examined effects on several categories of behavior and have focused on three: environmental citizenship (e.g., voting, signing petitions, writing members of Congress), policy support (e.g., willingness to sacrifice to comply with mandatory recycling or other government requirements), and private sphere behaviors (e.g., consumer behavior). Stern et al., *supra* note 53, at 82–88, 96. The findings suggest that the ultimate allocation of behavior into direct environmental and civic behaviors will require close attention. It may be the case that consumer behaviors are distinct from participation in mandatory government programs such as some recycling programs. These "policy support" behaviors may more closely resemble civic behaviors than consumer behaviors in their responsiveness to norm activation.

[92] For example, the VBN theory is better at predicting willingness to sacrifice (explaining 35% of the variance) and environmental citizenship (30%) than consumer behavior (19%). Stern et al., *supra* note 53, at 90.

behaviors). These expressive functions of law have been the subject of extensive treatment in the legal literature.[93]

The law also can have a third, more direct, effect on belief change that has received less attention in the literature: the required disclosure of information that is targeted at the types of beliefs that activate norms.[94] Norm activation theory identifies the importance of carefully targeting the information generated by this direct informational regulatory approach. In particular, when applied to environmental behaviors, norm activation theory suggests that legal interventions should seek to change individuals' awareness of consequences and acceptance of responsibility related to the environmental protection and reciprocity norms. The belief changes necessary for norm activation differ between the two norms.

To activate concrete norms related to the abstract environmental protection norm, the law should induce individuals to believe that the environmental problems caused by their behavior are significant (AC), and that if they change behavior these problems can be ameliorated (AR). Although gathering information on the contribution of any one individual often is prohibitively expensive and intrusive, information on the *mean* individual also may lead to norm activation.[95] In many cases the contribution of a single individual to an environmental problem over the course of a short period of time is miniscule, but the individual's contribution to the problem is more apparent if expressed over a year or a lifetime.[96] A recent work in the mass media accomplished this in dramatic fashion by dumping in the front yard of a suburban house the load of coal necessary to provide electricity to the average American household for a day.[97] Another focused on household energy conservation by placing in the front yard of a sample house all of the goods in the house made from petroleum.[98] Despite the visual appeal of these examples, the environmental problems caused by any one individual's behavior often will be minimal even over the course of a lifetime, and will only be significant if the *aggregate* effects of all individuals are considered.

In sum, for an individual who holds the abstract norm of environmental protection, the environmental norm activation theory suggests that norm activation will occur if new information induces the individual to believe that the *mean* individual's behavior or that individuals' behavior in the *aggregate* causes an environmental problem (AC) and that reductions in the behavior (e.g., backyard burning or driving) by the mean individual or by

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[93] For recent discussions of the expressive function of law, see Geisinger, *supra* note 54, at 44–55; McAdams, *supra* note 33, at 343–47.

[94] *See* discussion *infra* notes 159–169.

[95] For some behaviors, the median individual may be more meaningful.

[96] *See, e.g.*, PAUL SLOVIC, THE PERCEPTION OF RISK 70–71 (2000) (noting that a risk that is expressed as a lifetime cumulative risk may be more likely to provoke a behavior change than if expressed on a per-occurrence basis).

[97] *See* KILOWATT OURS (Jeff Barrie, 2004).

[98] *See* Tim Appenzeller, *The End of Cheap Oil*, NAT'L GEOGRAPHIC, June 2004, at 80.

individuals in the aggregate will ameliorate the problem (AR). These belief changes will activate a concrete norm against engaging in the behavior.[99] The individual will feel an obligation to engage in either a direct environmental behavior or a civic behavior, and the individual will engage in the behavior absent other constraints.

Even if the new beliefs about the mean or aggregate environmental effects create a sense of obligation, however, the individual may not change behavior if she also believes that others are not doing their fair share.[100] "Others" in this case could mean other individuals or other source categories (e.g., industry or agriculture). In these situations, additional information may change the behavior of those who hold the reciprocity norm if the information leads the individual to believe that others either have reciprocated or will reciprocate cooperative acts, and thus that the individual is not a sucker.[101] To the extent the individual's reference point is other individuals, the information will be most influential if it induces the individual to believe that she is responsible for a meaningful *relative* share of the environmental problem (AC) as compared to the *mean individual*, and that, because the mean individual has changed or will change behavior, doing her fair share to ameliorate the problem requires behavior change (AR).[102] If this information activates norms and changes behavior, the mean will decline over time, providing a downward ratchet on the measure against which individuals assess their behavior.[103]

To the extent the individual's reference point is other source categories, the information will be most influential if it induces the individual to believe that individuals in the aggregate are responsible for a meaningful *relative* share of the environmental problem (AC) as compared to other *source categories*, and that, because other source categories have changed or will change behavior, individuals should change behavior to do their fair share to ameliorate the problem (AR). These beliefs about the consequences of and acceptance of responsibility for behavior will then tie the abstract reciprocity norm to concrete norms against those who do not do their fair share to solve collective problems. The product of this belief change will be norm activation and an increased likelihood that individuals will feel an obligation to change their behavior. Figure 1 provides a dia-

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[99] The information necessary to induce behavior change may be the quantity of pollutants released or the actual harms caused. *See* discussion *infra* notes 217–228.

[100] *See, e.g.*, Christopher Bratt, *The Impact of Norms and Assumed Consequences on Recycling Behavior*, 31 ENV'T & BEHAV. 630, 631 (1999) (noting that data on environmental harms may be insufficient to induce behavior change without information that focuses on beliefs about others' contributions).

[101] *See* Ostrom, *supra* note 29, at 40.

[102] I discuss *infra* notes 111–119 whether the others must be other specific individuals, individuals as a group, or other pollution source categories.

[103] Of course, the mean also could shift upward over time. If so, information about the shift will provide policymakers and interest groups with the basis to debate the implications of the shift and the appropriate response. *See* discussion *infra* notes 216–218.

gram of the theory, with awareness of consequences represented as AC and ascription of responsibility represented as AR.[104]

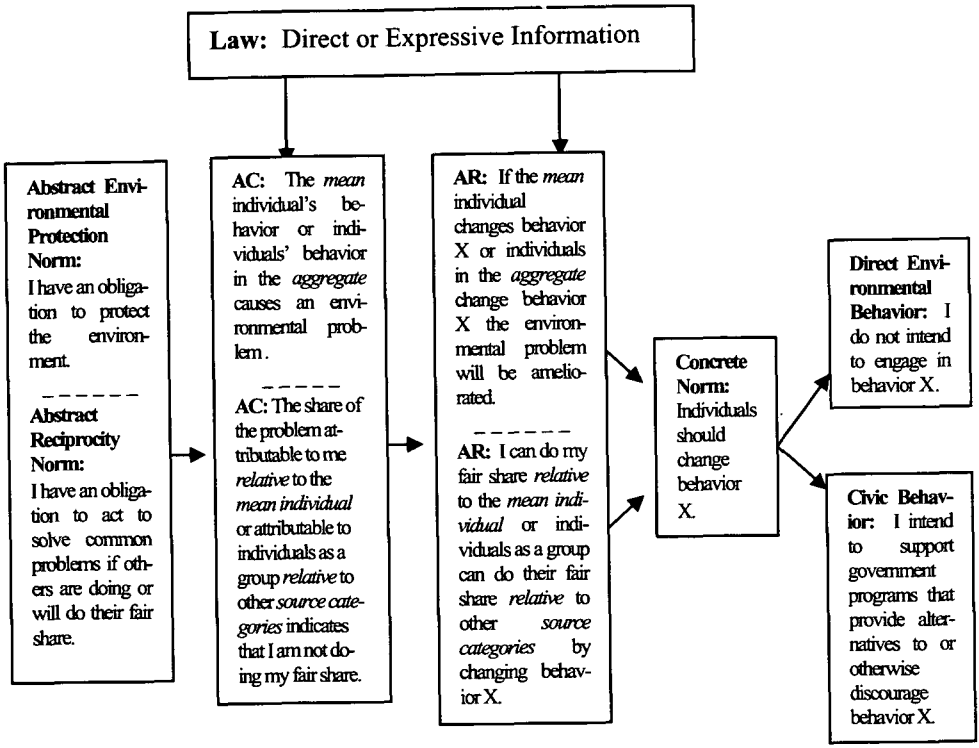

FIGURE 1: ENVIRONMENTAL NORM ACTIVATION THEORY

In some cases, activating the environmental protection norm may be sufficient to shift individuals' behavioral intentions, but in many cases change also may require activating the reciprocity norm.[105] In addition, even if norm activation does not induce individuals to take specific steps to reduce pollution, it may induce them to act in a civic capacity to build the background political support for the other measures that will resolve nega-

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[104] The adaptations from the VBN theory can be seen by comparing Figure 1 with Stern et al., *supra* note 53, at 84 fig.1. For brevity, I have used language in the examples of direct environmental and civic behavior that describes behavioral intentions. As discussed in the text, I assume that absent other constraints behavioral intentions will lead to behavior.

[105] In addition, although the information about the *mean* and *aggregate* effects of individual behavior may be particularly important for the influence exerted by the abstract environmental protection norm, and the *relative* share information may be particularly important for the influence exerted by the abstract reciprocity norm, the concepts are similar and in some situations both types of information may affect both norms.

tive-payoff, loose-knit group situations.[106] These civic behavior changes may be particularly important for problems where changing the underlying direct environmental behavior (e.g., commuting by automobile) requires the individual to exert sustained or substantial effort. For these problems, norm activation may be less likely to change the direct environmental behavior than the civic behavior necessary to induce government to invest in financial incentives (e.g., subsidies for bus riders) or new infrastructure (e.g., new mass transit systems).

3. The Collective Perception Challenge.—Perhaps the most important challenge for the theory is whether norm activation will occur if an individual believes that all individuals in the aggregate cause an environmental problem but that the individual's personal contribution is inconsequential. Environmental protection norm activation may not occur if an individual believes that she personally does not cause a perceptible environmental problem, even if she believes that individuals are doing so in the aggregate, and even if she believes that the mean individual is doing so over an extended period. Similarly, reciprocity norm activation may not occur if the individual does not believe that her relative share of the problem is large, even if she believes that the aggregate individual share is large relative to other source categories (e.g., industry or agriculture), or if she believes that her personal share is large relative to the individual mean. This is a particularly difficult challenge because in most cases an individual's behavior will not cause a perceptible problem and her relative share will not be large, at least as compared to industrial sources. In addition, it is often prohibitively expensive and intrusive to generate information about the problems caused by specific individuals.

Several empirical studies in the social psychological literature, however, provide reason for cautious optimism. Studies of personal identity theory suggest that individuals tend to form categories to facilitate cognitive processing, and the categorization tends to lead individuals to ignore differences among the items assigned to a particular category and to accentuate the differences between the items in different categories.[107] This categorization extends to groups of people, and when an individual categorizes herself as a member of a group, she may view herself to be an example of the group as much as an autonomous individual.[108] Studies also indicate that information that makes an individual's group identity more salient can influence the personal norms that individuals apply to a given situation and can

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[106] *See* discussion *supra* notes 91–92. Many individuals may lack the resources to take a direct environmental behavior (e.g., to replace a high-emitting vehicle), and civic behavior may be the only response available to them.

[107] *See* Alex Geisinger, *A Group Identity Theory of Social Norms & Its Implications*, 78 TUL. L. REV. 605, 632–34 (2004).

[108] *Id.* at 635.

influence their behavior.[109] Although group identity typically relates to various subcategories of individuals (e.g., the elderly, baseball fans, or law professors),[110] I suggest that if given sufficient information individuals also may conceive of themselves as members of the individual category of polluters, as compared to other, more traditional polluters such as industry. If so, information that makes the individual's membership in the individual source category salient may enable information about the aggregate impacts of individuals to activate norms.

Several studies of environmental behavior support the hypothesis that information about the aggregate effects of individual behavior can activate norms and change behavior. For example, the study of backyard burning discussed above found that increases in AC and AR were associated with personal norm activation and attendant decreases in backyard burning. The questions used to examine AC and AR asked about aggregate effects: the harms caused by backyard burning in general, not the harms caused by the specific respondent's backyard burning.[111] Thus information about the aggregate harms caused by backyard burning and the steps that could be taken in the aggregate to reduce those harms appear to affect norms and behavior regarding backyard burning.

A more recent study did not examine norm activation explicitly, but asked respondents about three situations in which the researchers made it clear that although the respondent's individual behavior would not have a perceptible effect on an environmental problem, aggregate behavior change would.[112] The study concluded that many individuals will take some types

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[109] *See id.* at 630–31 (noting a study that concluded that individuals who were induced to view themselves as "elderly" walked more slowly than those who were not exposed to information that made their elderly group identification salient). A growing body of empirical evidence suggests that the individual and group conceptions are located in distinct areas of the brain. *See id.* at 630 (citing Theodore M. Singelis, *The Measurement of Independent and Interdependent Self-Construals*, 20 PERSONALITY & SOC. PSYCHOL. BULL. 580, 583 (1994)); *see also* Brian Lickel et al., *Varieties of Groups and the Perception of Group Entitativity*, 78 J. PERSONALITY & SOC. PSYCHOL. 223, 224–25 (2000) (noting the influence of the perception of "a collection of persons . . . as being bonded together in a coherent unit").

[110] *See* Geisinger, *supra* note 107, at 632–39.

[111] *See* Van Liere & Dunlap, *supra* note 83, at 180 (including "some people" and "the smoke from backyard burning" in a question asked to assess AC and "other sources" in a question asked to assess AR). Although Van Liere and Dunlap found that both AR and AC were related to yard burning behavior, the association with AC was indirect. *Id.* at 184–85. In one study, Stern and colleagues defined AC on solely individual terms. Stern et al., *supra* note 53, at 83 (referring to whether "one's own actions" cause harm as the issue to be queried to assess AC). They also asked questions about AC that were more general, however. *Id.* at 96 (asking the respondent about "the problem of toxic substances in air, water and the soil" rather than about her personal contribution to the problem). They concluded that beliefs about AC held on this general level were much more strongly correlated with changes in civic behavior than with changes in consumer behavior, but the question did not distinguish a belief that individuals in the aggregate caused the toxic substances problem from a belief that industry caused the problem. *Id.*; *see also* Bratt, *supra* note 100, at 631 (discussing the distinction between individual and collective consequences of behavior).

[112] *See* PELLIKAAN & VAN DER VEEN, *supra* note 53, at 205–06. The study was conducted in the

of initial cooperative environmental action even in negative-payoff, loose-knit group situations.[113] Two of the behavior changes, taking household chemical waste to recycling centers and reducing home energy use, involved small, although not insubstantial, costs to the individual. The third situation, changing holiday travel, involved more substantial costs to the individual. A first striking finding of the study is that when asked to order their preferences, the respondents strongly favored cooperative acts for the two less expensive behavior changes, even if others chose not to cooperate.[114] The respondents chose mutual cooperation as by far their favored option, but they even chose unilateral cooperation (the "sucker" situation) over free-riding or mutual non-cooperation.[115] Even for the more expensive behavior change involving holiday travel, most chose mutual cooperation, although for this behavior they choose free-riding and mutual defection over the sucker behavior.[116]

A foundational assumption of traditional rational choice analysis regarding individuals' decisionmaking when facing collective action problems is that individuals will choose free-riding over other options.[117] In the traditional account, the preference for free-riding can be overcome by government regulation, changes in financial incentives, or social sanctions. For certain environmental behaviors, however, including some of the toxic chemical-releasing behaviors that are the focus of this Article, the study challenges the assumption that individuals prefer free-riding to other options. Although further empirical work will be necessary, the study suggests that in some cases information about the aggregate environmental effects of individual behavior will induce cooperative acts in a substantial proportion of the population, even if any one individual's contribution to the problem is imperceptible.

Netherlands and included roughly 900 respondents.

[113] *See id.*

[114] As an example of the types of situations that were used to identify the respondents' preferences regarding household toxic waste, they were asked to rank the following: (1) "You throw the waste away but other persons bring their waste to the collection point. This costs you no extra time and effort and environmental pollution will decrease"; (2) "You bring the waste to the collection point and so do the other persons. This costs you extra time and effort but environmental pollution will decrease"; (3) "You throw the waste away and so do the other persons. This costs you no extra time and effort but environmental pollution will increase"; and (4) "You bring the waste to the collection point but the other persons throw their waste away. This costs you extra time and effort and environmental pollution will increase." *Id.* at 73.

[115] *See id.* at 74. In fact, the authors concluded that unconditional cooperators accounted for roughly 91% of the respondents regarding household toxic waste, 86% regarding household energy conservation, and 51% regarding holiday travel. Those who favored free-riding accounted for 5%, 5%, and 10%, respectively. *Id.* at 205–06. Although one possible explanation for these results is that the respondents were unwilling to express their true preferences to the surveyors, the fact that many more were willing to identify their preferences for free riding regarding holiday travel suggests that this type of bias is not a complete explanation for these results. *Id.* at 83.

[116] *Id.* at 73.

[117] *See* OLSON, *supra* note 29, at 64.

The study also has implications for the type of information that will induce abstract reciprocity norm activation. Although the higher cost of changing holiday travel may explain the respondents' reduced cooperation, the respondents also indicated that they expected far less cooperation by other individuals regarding changes in holiday travel than regarding household chemical waste or energy conservation.[118] The aggregate amount of expected behavior change by others thus may define an individual's sense of her "fair share" of behavior change. If so, this further supports the proposition that information about the aggregate individual contributions to a problem and changes in behavior may activate the reciprocity norm. If information can activate the reciprocity norm regarding individuals as a source category, it also may activate the norm where the benchmark is other categories of sources, such as industry or agriculture. The willingness of individuals to generalize when determining the appropriate group against which to benchmark their behavior also is consistent with the findings of other empirical work, which has concluded that consumers will purchase green products only to the extent that they consider doing so constitutes their "fair share" of pro-environmental behavior.[119]

III. THE EXPLANATORY CAPACITY OF NORM ACTIVATION

In Part III, I examine the explanatory power of the environmental norm activation theory for two types of measures (environmental norm campaigns and product labeling) that target individual behavior. Stated in the negative, the theory predicts that if individuals believe that the mean, aggregate and relative effects of their behavior are not substantial, concrete norms linked to the environmental protection and reciprocity norms will not be activated and little pro-environmental behavior will occur. In Part III.A, I explore studies of individuals' beliefs on these topics. In Part III.B, I then examine the information typically conveyed by environmental norm campaigns and product labeling schemes, and I argue that the theory provides a more complete explanation for the limited effects of these measures.

A. Environmental Beliefs

Environmental norm activation theory highlights the importance of understanding individuals' beliefs about the mean, aggregate and relative effects of their behavior when seeking to understand normatively influenced

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118 *See* PELLIKAAN & VAN DER VEEN, *supra* note 53, at 208.

119 *See* Johannes Moisander, *Attitudes and Ecologically Responsible Consumption: Moral Responsibility and Concern as Attitudinal Incentives for Ecologically Sound Consumer Behavior, in* TUTKIMUKSIA FORSKNINGSRAPPORTER RESEARCH REPORTS 218 (1996); *see also* Michael Schwartz & Shuva Paul, *Resource Mobilization Versus the Mobilization of People, in* FRONTIERS IN SOCIAL MOVEMENT THEORY 205–23 (A.D. Morris & C.M. Mueller eds., 1992) (noting conditions for overriding free rider problems in groups, including sense of group consequences and that group action will address the problem).

behavior change. Although few studies have framed questions that explicitly ask about mean, aggregate and relative effects, several provide insights about public beliefs on these points.

1. Mean and Aggregate Effects of Individual Behavior.—Surveys rarely ask about the perceived sources of pollution problems,[120] but those that do demonstrate that many individuals do not believe that individual behavior is a substantial cause of pollution.[121] Individuals' beliefs commonly are founded on misconceptions about core facts relevant to individual behavior. Empirical studies suggest that individuals believe they know a great deal about the sources and effects of pollution.[122] In fact, they have remarkably little information and their beliefs are often incorrect.[123] For example, a 1999 survey concluded that only about one-quarter of the respondents knew that most electricity is generated through fossil fuel burning, a major source of air pollution, when well over half is actually generated in this way.[124] These types of misconceptions may contribute to individuals' tendency to underestimate the environmental problems caused by individual behavior.

2. Relative Share Compared to Industry.—Individuals also consistently underestimate their relative share of emissions as compared to industrial sources. For example, the 1999 survey concluded that few respondents know that the most common source of water pollution is non-point runoff (which is caused in part by individuals and households), not industrial point sources.[125] The belief that individuals are a smaller source of environmental

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[120] For example, two major sources of polling data are Harris polls and the General Social Survey ("GSS"). Although the word *pollution* appeared in ninety Harris poll questions between 1965 and 1990, the words *pollution* and *cause* appeared only ten times. Public Opinion Poll Question Data Base (maintained by The Odum Institute), *at* http://www2.irss.unc.edu/data_archive/pollsearch.html (last visited July 9, 2004). Since 1990, the word *pollution* has appeared in twenty-four Harris poll questions; the words *pollution* and *cause* have not appeared. *Id.* (statistics given for questions asked since 1990 were current as of June 30, 2003). The GSS has collected data since 1972, but it only included questions about the danger of *pollution caused by cars* versus *pollution caused by industry* in 1993, 1994, and 2000. General Social Survey 1972–2000 Cumulative Codebook (maintained by The National Public Opinion Research Center), *at* http://www.icpsr.umich.edu/GSS/index.html (last visited July 9, 2004).

[121] *See, e.g.*, NEETF, 1999 REPORT CARD, *supra* note 71, at 27; Rouge River Nat'l Wet Weather Demonstration Project, The Rouge River Project, *at* http://www.rougeriver.com [hereinafter Rouge River Demonstration Project] (last visited Aug. 19, 2004).

[122] Roughly 70% of the respondents stated that they know either "a lot" or "a fair amount" about environmental problems. NAT'L ENVTL. EDUC. & TRAINING FOUND. & ROPER STARCH WORLDWIDE, 1997 NATIONAL REPORT CARD ON ENVIRONMENTAL KNOWLEDGE, ATTITUDES, AND BEHAVIORS SUMMARY AND OVERVIEW 13 (1997) [hereinafter NEETF, 1997 REPORT CARD]. According to a 1992 Gallup survey, only 53% believe "lack of education—people just don't know what to do to protect the environment" contributes to environmental problems "a great deal." DUNLAP ET AL., *supra* note 71, at 37 tbl.7.

[123] *See* NEETF, 1997 REPORT CARD, *supra* note 122, at 20–30.

[124] *See* NEETF, 1999 REPORT CARD, *supra* note 71, at 27.

[125] *See id.*

harms than industry appears to have developed at least as early as the mid-1960s, when the public became aware of the pollution problem for the first time.[126] National public opinion studies demonstrate that the belief has remained widespread from the 1970s[127] through the 1990s.[128]

Studies conducted on a local basis also have detected the common belief that individuals are a smaller source of pollutants than industry. For example, polling conducted for a study of non-point source water pollution of the Rouge River in Michigan concluded that individuals routinely underestimate their contribution to non-point pollution.[129] Similarly, residents of

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[126] *See* PETER C. YEAGER, THE LIMITS OF LAW: THE PUBLIC REGULATION OF PRIVATE POLLUTION 103 (1991) (noting an increase from 34% to 64% in the percentage identifying industry as among the primary causes of water pollution between 1965 and 1970). In 1965, 34% considered factories and plants one of the "most important causes" of air pollution. Hazel Erskine, *The Polls: Pollution and Industry*, 36 PUB. OPINION Q. 263, 265 (1972). By contrast, only 27% considered exhaust from cars an important cause, and it is unclear whether the respondents attributed car exhaust to individuals or industry. *Id.*

[127] In 1970, 64% of those surveyed considered factories and plants to be an important cause of air pollution and 62% viewed cars an important cause. Even though concern over cars increased, the public appeared to blame the auto industry at this point. For example, in 1970, 30% of the population felt auto manufacturers were to blame for air pollution—placing the industry only behind chemical, oil, steel and electric power industries. *Id.* at 263, 265. According to a 1972 Harris poll, 87% of the population considered smoke from industrial plants a major cause of air pollution while 75% considered car exhaust a major cause. Public Opinion Poll Question Data Base, *supra* note 120 (Harris Survey No. 2216, question 16 (1972)). Concern over cars also still appeared to be directed at manufacturers, not drivers. Public Opinion Poll Question Data Base, *supra* note 120 (Harris Survey No. 7484, question 14 (1974)) (noting that 56% considered car engines without emission controls a major cause of pollution).

[128] In the early 1980s, just under half of the population (49%) considered air pollution by industry to be a very serious problem, and industry was still viewed as a larger source than cars (33% considered air pollution by trucks and cars a very serious problem). Public Opinion Poll Question Data Base, *supra* note 120 (Harris Survey No. 822033, question 2 (1982)). Similarly, approximately two-thirds of the public considered water pollution by toxic substances from factories to be a very serious problem when asked four times between 1978 and 1986. Public Opinion Poll Question Data Base, *supra* note 120 (Harris Survey Nos. 7882, question 2 (1978), 822033, question 2 (1982), 851204, question 2 (1985), 861203, question 5 (1986)). Data from the 1990s are more mixed. In 1993, 27.8% said air pollution from industry was extremely dangerous. General Social Survey 1972–2000 Cumulative Codebook, *supra* note 120 (variable name: INDUSGEN). In 1994, that number fell to 22%, but by 2000 it rose to 30%. *Id.* A 1992 Gallup survey indicated that in some situations, individuals estimate the individual share to be higher than that of industry. DUNLAP ET AL., *supra* note 71, at 37 tbl.7 (noting that when asked how much six factors contribute to environmental problems, 73% said "waste by individuals" contributes a great deal while only 69% said "business and industry" contribute a great deal). To choose industry, however, respondents had to choose the phrase "Business and industry—they care more about growth than protecting the environment." Although previous polls indicate that the public considered industry a major source, the public did not necessarily view industry as caring more about growth.

[129] Rouge River Demonstration Project, *supra* note 121. The Michigan Rouge River Project included public education designed to improve water quality. Surveys on attitudes were taken in 1993, the Project's second year, and in 1999. In 1993, residents were asked to identify the principal source of Rouge River water quality problems, and 42% indicated "waste from businesses and industrial facilities flowing directly into the river," 24% indicated "sewer overflow problems," and 25% indicated "chemicals, oils, fertilizers, and salts . . . washed into the river by rain." Wayne County Dep't of Env't, A Strategy for Public Involvement (1993 survey of area residents conducted by Public Sector Consultants,

the Galveston, Texas area consistently underestimate the role of individuals as sources of Galveston Bay water pollution.[130] Furthermore, although surveys typically do not explore the extent to which individuals are aware of the harms they cause to themselves or others in their households, given the limited and often incorrect knowledge about their contributions to environmental harms generally, it is likely that they also underestimate the extent to which they contribute to these internalized harms.

B. Explaining Prior Norm Efforts

In light of these public beliefs, environmental norm activation theory suggests a more complete explanation for the findings of the leading studies of environmental norm campaigns and product labeling schemes. The studies have concluded that norm campaigns and product labels have little effect on behaviors that occur in negative-payoff, loose-knit group situations, particularly if behavior change requires sustained or substantial effort. Given the limited effects of these norm-based measures, the studies have argued that policymakers should turn to more expensive measures, such as infrastructure investments and economic incentives. The analysis here suggests that the limited effects may result from a failure to convey the types of information that will activate the environmental protection and reciprocity norms, rather than the inherent limitations of normative influence.

1. Studies of Norm Campaigns and Labeling Schemes.—The leading study of environmental norm campaigns examined a large body of empirical work on recycling.[131] The study concluded that those who hold a strong pro-environmental personal norm often recycle even when doing so is inconvenient or requires sustained effort.[132] Although this finding suggests that personal norms have important influences on behavior, the study also concluded that persuasive

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Inc., for Rouge River National Wet Weather Demonstration Project; see question 11), *available at* http://www.rougeriver.com/involvement. Waste from industry received the most responses, although residents still considered runoff to be a serious problem. *Id.* (question 17).

[130] Polling was conducted in Galveston, Texas in 1996, 1998, and 2000 regarding the relative contributions of individuals and industry to surface water contamination. *See* Stephen L. Klineberg, Perspectives on Environmental Issues in the Galveston Bay Area and Across the State of Texas: Updated Report to the Galveston Estuary Program, Based on Expanded Surveys from 1996, 1998, and 2000 (May 2000) (unpublished manuscript on file with the author). The survey asked respondents to select between two "primary causes of pollution in Galveston Bay": industrial activity ("oil refining and chemical plants") and individual behavior ("cars, litter and lawn care products"). *Id.* at 24. In 1996, only 24% correctly identified individuals. When the question was asked again in 1998 after various public education programs, the number rose to 33%. *Id.* at 24–25. When asked again in 2000, after education programs ended, the number dropped to 23%, roughly the same level before the programs. *Id.*

[131] *See* Carlson, *supra* note 2, at 1271–95. Recycling often occurs in negative-payoff, loose-knit group situations. The material benefits to the individual of recycling are often far less than the time and effort necessary to recycle, and recycling often is not conducted in close-knit settings.

[132] *See id.* at 1295–96. Strong pro-environmental views also predict the volume recycled. *Id.* at 1282–83.

norm campaigns have limited effects on overall recycling rates.[133]

In particular, the study concluded that although several types of norm campaigns have short-term effects and effects on low-intensity recycling behaviors, they appear to have far less influence on recycling behaviors that require substantial effort over an extended period of time. Of the various types of norm campaigns, face-to-face programs had the largest positive overall effects on recycling. In face-to-face norm campaigns, a loose-knit group is essentially converted into a close-knit group through the presence of repeated, face-to-face interactions among the recyclers and their "block captains."[134] These face-to-face norm campaigns are expensive, however, and time-consuming to conduct. In addition, recycling rates appear to be influenced more by convenience (e.g., the existence of a curbside collection service for recycled goods) and financial incentives than by norm campaigns.[135] The study concluded that where sustained or substantial behavior change is required, most norm campaigns have limited effects, and government agencies thus should devote resources to increasing convenience and financial incentives rather than norm management.[136] Studies of other types of norm campaigns have reached similar conclusions.[137]

A second area in which norms confront negative-payoff, loose-knit group situations is product labeling.[138] Some labeling schemes are directed at large-payoff situations: they require manufacturers to provide consumer product labels that enable users to avoid exposing themselves to the toxic chemicals in the products.[139] More generalized "eco-labeling" schemes,

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133 *See id.* at 1296–97.

134 *Id.* at 1291. An individual may conclude after a visit from a block captain that a behavior she thought was being conducted anonymously will now be observed by one or more neighbors with whom she has an iterative relationship. *See also id.* at 1281–82 (noting the importance of feedback on recycling).

135 *See id.* at 1275, 1292. This conclusion is consistent with conclusions reached in the social psychology literature. *See, e.g.*, Stern, *supra* note 62, at 464 (noting the importance of "the amount of effort, expense, or inconvenience required to change the target behaviors"). Stern also notes that financial incentives and convenience can influence environmental behaviors. *Id.* at 468–69.

136 *See* Carlson, *supra* note 2, at 1299.

137 *See, e.g.*, Bratt, *supra* note 100, at 631 (concluding that "campaigns in the mass media that provide environmental information or prompts to behave in an environmentally friendly manner have brought disappointing results") (citing Raymond de Young, *Changing Behavior and Making It Stick: The Conceptualization and Management of Conservation Behavior*, 25 ENV'T & BEHAV. 485 (1993)); H.J. Staats et al., *Communicating the Greenhouse Effect to the Public: Evaluation of Mass Media Campaign from a Social Dilemma Perspective*, 45 J. ENVTL. MGMT. 189 (1996).

138 *See, e.g.*, Peter S. Menell, *Structuring a Market-Oriented Federal Eco-Information Policy*, 54 MD. L. REV. 1435 (1995). Menell did not focus expressly on norms, but his observations are consistent with the conclusion that, at least in the short term, labels often do not have normative effects sufficient to induce pro-environmental consumer behavior.

139 Many labeling programs focus on individuals as risk recipients, not risk creators. Perhaps the best example is California Proposition 65, which requires businesses to provide a "clear and reasonable" warning before "knowingly and intentionally" exposing any person to a listed chemical. *See* Michael W. Graf, *Regulating Pesticide Pollution in California Under the 1986 Safe Drinking Water and Toxic*

however, are often directed at negative-payoff, loose-knit group situations: they are not designed to enable the individual to avoid harming herself, but instead appeal to her desire to reduce the environmental impacts of her product choices. The choices often occur in shopping malls, over the Internet, or in other loose-knit group situations.[140]

At least in theory, eco-labels may induce an individual to act in the common good in negative-payoff, loose-knit group situations by changing beliefs about the characteristics of a product and activating norms (e.g., by changing beliefs about the harm to tropical forests of use of a particular wood).[141] Nevertheless, several studies have concluded that eco-labels have little effect on consumer behavior.[142] In particular, eco-labels appear to have little effect on consumer purchasing decisions unless most or all other factors (e.g., the price and quality of the good) are equal.[143] Given that labels are largely unsuccessful, the labeling studies advocate using price (e.g.,

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Exposure Act (Proposition 65), 28 ECOLOGY L.Q. 663 (2001); Menell, *supra* note 138, at 1442. Similarly, a provision included in the Safe Drinking Water Act Amendments of 1996 requires drinking water providers to provide customers with periodic, detailed reports on the pollutants present in drinking water. *See* 42 U.S.C. § 300g-3(c)(4) (2000) (requiring "consumer confidence reports"). Other labeling schemes seek to reduce internalized risks as well as the extent to which the individuals externalize risks. For example, in the Energy Policy and Conservation Act, Congress required the Federal Trade Commission to impose energy efficiency labeling requirements on home appliances. *See* Pub. L. No. 94-163, 89 Stat. 871 (1975) (codified as amended at 42 U.S.C. §§ 6201–6422 (2000)). The EPA also has developed voluntary labeling programs, such as the Energy Star program, which enable consumers to save money and reduce their environmental impact by purchasing energy efficient goods. *See* U.S. EPA, Energy Star, *What* Is *Energy Star?*, *available at* http://www.energystar.gov/index.cfm?c=about.ab_index (last visited Mar. 23, 2004).

[140] Eco-labeling schemes often use life-cycle analysis to assess production through disposal of the product and award a label for preferable products. *See* Roger D. Wynne, *The Emperor's New Eco-Logos?: A Critical Review of the Scientific Certification Systems Environmental Report Card and the Green Seal Certification Mark Programs*, 14 VA. ENVTL. L.J. 51, 64–76 (1994).

[141] *See* Eric W. Orts, *Reflexive Environmental Law*, 89 NW. U. L. REV. 1227, 1271 (1995) (noting that these labels appeal "to the values of everyday consumers").

[142] *See, e.g.*, U.S. EPA, EVALUATION OF ENVIRONMENTAL MARKETING TERMS IN THE U.S. iii (1993) (noting that "studies also show that . . . many consumers often do not act on their own assertion that they would preferentially purchase products that are less damaging to the environment"); U.S. EPA, STATUS REPORT ON THE USE OF ENVIRONMENTAL LABELS WORLDWIDE 30–31 (1993) (stating that consumer interest in eco-labels "does not necessarily affect the actual purchasing choices that consumers make"); Roy C. Andersen & Eric N. Hansen, *Determining Consumer Preferences for Ecolabeled Forest Products*, 4 J. FORESTRY 28 (2004) (finding that eco-labeled wood products outsell others but not when priced at a two percent premium); James Salzman, *Informing the Green Consumer: The Debate over the Use and Abuse of Environmental Labels*, 1 J. INDUS. ECOLOGY 11, 13 (1997) (noting that eco-labeling programs' consumer effect "still has not been answered empirically," but noting that in any event labels may influence product design); Richard B. Stewart, *A New Generation of Environmental Regulation?*, 29 CAP. U. L. REV. 21, 96–97 (2001); *see also* Jamie A. Grodsky, *Certified Green: The Law and Future of Environmental Labeling*, 10 YALE J. ON REG. 147 (1993).

[143] *See* Stern, *supra* note 62, at 468 (concluding that "little or no effect has been achieved when there are important barriers to action external to the individual, such as significant cost or inconvenience"); Stewart, *supra* note 142, at 96–97.

the use of fees or reductions in natural resource subsidies) and other methods to steer consumer behavior.[144]

The conclusions of the labeling and recycling studies lead to pessimism about the ability of policymakers to influence individual environmental behavior in negative-payoff, loose-knit group situations. In short, norms appear to have limited influence in these situations, at least when sustained or substantial effort is required. Expensive face-to-face norm campaigns, infrastructure changes, financial incentives and tax and subsidy schemes appear to be the only effective options. Yet for both norm campaigns and labeling, in the absence of normative influence favoring pro-environmental behavior, policymakers generally lack the political support to pursue expensive infrastructure, financial incentive and other schemes targeted at individuals.[145] Thus providing financial incentives or increasing convenience often will be appealing in theory but infeasible in practice.[146] Coercive legal requirements are often at least as unpopular. The recycling and labeling studies thus leave policymakers with few viable options to shift many behaviors.

2. *Information Provided by Norm Campaigns and Labeling Schemes.*—The failure of many norm campaigns and labeling schemes when confronting negative-payoff, loose-knit group behaviors may simply reflect the limited influence of personal norms in the face of countervailing influences, but environmental norm activation theory provides an alternative explanation. In particular, the limited influence of personal norms may be the result of the types of information disseminated, rather than any inherent limitations of norms. The theory suggests that given the widespread belief that individual behavior does not have large mean or aggregate effects, or relative effects as compared to large industrial sources, interventions that do not change these beliefs will not activate concrete norms linked to the abstract environmental protection and reciprocity norms. Studies of norm campaigns and product labeling have directed the

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144 *See, e.g.*, Menell, *supra* note 138, at 1465–72 (proposing methods of changing product prices as well as other options, such as an analysis of the average daily activities of a consumer modeled on the nutrition pyramid).

145 In the absence of public support, it may be impossible to fund face-to-face norm efforts, to invest in infrastructure or to provide financial incentives. *See* Stern, *supra* note 62, at 476 (noting that "it has long been politically impossible in the United States to enact certain policies, such as increased energy taxes, that would increase the financial incentives for energy conservation"). Efforts to regulate individual conduct directly have met with similar public resistance. *See* Joel Connelly, *Earth Day 2000: Local Efforts Reflect Global Goals; Healthy Environment Considered a Right*, SEATTLE POST-INTELLIGENCER, Apr. 21, 2000, at A1 (quoting former EPA Administrator William Ruckelshaus for the statement that "'[i]f you go into any city, 80 percent of the people would agree that the Clean Air Act should be strengthened . . . [b]ut if you ask them to spend 20 minutes a year in a vehicle-inspection program, 80 percent will resist'"); Vandenbergh, *supra* note 3, at 585–97.

146 In addition, if individuals begin with a presumption of others' cooperativeness, financial incentives, by signaling an absence of widespread cooperation or undermining individuals' ability to send a signal, can magnify collective action problems. *See* Kahan, *supra* note 62, at 76–77.

bulk of their analysis to the format in which the information is delivered (e.g., whether a norm campaign is conducted on a face-to-face or more impersonal basis). The studies have directed less attention to the specific types of information provided and the types of belief change and norm activation that can be expected to arise as a result.

A focus on the types of information conveyed by norm campaigns and product labels reveals that they often do not provide the information necessary to activate norms, and in some cases may even reduce individuals' sense of obligation to act. Most environmental norm campaigns are conducted as advocacy campaigns. They advocate that individuals recycle certain solid wastes,[147] dispose of hazardous wastes properly,[148] drive less on "Ozone Alert" days,[149] conserve energy,[150] or refrain from littering,[151] often using a hortatory message asserting that individuals have an obligation to act. These campaigns often provide the target audience with surprisingly little information on the mean or aggregate effects of the target behavior or the relative share of the effects of the behavior as compared to other sources. For example, state and local governments around the country are struggling to change individual behavior to meet a tough new EPA ozone standard.[152] The EPA and the federal Department of Transportation are conducting a joint effort to provide information that the state and local governments can use in norm campaigns, but the materials provide little hard information on the mean, aggregate or relative share of ozone emissions

147 In 2002, EPA initiated a new waste reduction and energy recovery program. *See* U.S. EPA, Resource Conservation Challenge, *at* http://www.epa.gov/epaoswer/osw/conserve/index.htm (last visited Aug. 20, 2004). When the program was announced, an EPA official stated that the EPA was "challenging all Americans to take personal responsibility for their day-to-day decisions, and to take one small action every day to conserve our natural resources." *Id.* The Resource Conservation Challenge calls for an increase in the national recycling rate to 35% by 2005 and a decrease in the generation of thirty "Priority Chemicals" by 2005. *See id.* EPA also recently initiated the National Waste Minimization Partnership Program to reduce the generation of waste containing these thirty Priority Chemicals. *See* U.S. EPA, Office of Solid Waste, National Waste Minimization Partnership Program, *at* http://www.epa.gov/epaoswer/hazwaste/minimize/index.htm (last visited Aug. 20, 2004).

148 A number of states have conducted public information campaigns targeted at hazardous wastes, often using brochures. *See, e.g.*, Mo. Dep't of Natural Res., Preventing Pollution Begins with You, *at* http://es.epa.gov/techinfo/facts/missouri/miss-p2.html (last updated Mar. 1995); Cal. Integrated Waste Mgmt. Bd., Household Hazardous Waste, *at* http://www.ciwmb.ca.gov/hhw (last updated Jan. 5, 2005); Tenn. Dep't of Env't & Conservation, Household Hazardous Waste Program, *at* http://www.state.tn.us/environment/dca/hhw (last visited May 10, 2004). More general public education efforts also have been attempted. *See* Menell, *supra* note 138, at 1441 (noting that the National Environmental Education Act, Pub. L. No. 101-619, 104 Stat. 3325 (1990) (codified at 20 U.S.C. §§ 5501–5510 (2000)), authorized the expenditure of $65 million on consumer education).

149 U.S. EPA, It All Adds up to Cleaner Air, *at* http://www.italladdsup.gov (last visited June 8, 2004).

150 *See* Black et al., *supra* note 82, at 17–18 (discussing results of energy efficiency campaigns); Carlson, *supra* note 2, at 1252 n.61.

151 *See* Cialdini et al., *supra* note 89, at 1015–16.

152 *See* Clean Air Act Section 109, 42 U.S.C. § 7409 (2000); Whitman v. Am. Trucking Ass'ns, 531 U.S. 457 (2001).

contributed by any one type of individual behavior (e.g., driving) or by a group of the most important individual behaviors (e.g., driving, non-road motor use, and backyard burning).[153]

Similarly, recycling campaigns often provide little information on the mean, aggregate and relative environmental effects of recycling, and empirical studies often do not examine the types of information provided.[154] This may be the case in part because recycling efforts are often hard to justify based on their near-term environmental effects. Instead, for example, studies have concluded that the best justification for recycling is often not the environmental benefits, but the savings in landfill space.[155] Although landfill space and longer-term recycling benefits (e.g., conservation of scarce resources) are quite important, changes in beliefs about these issues may not lead to norm activation, at least in the near term, for many individuals. In addition, although norm campaigns are less constrained by space limitations than labeling efforts, the local governments that typically conduct the campaigns have limited funds for research and implementation.[156] As a result, norm campaigns rarely disseminate data on the mean,

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[153] For example, as of June 8, 2004, the joint EPA-Department of Transportation Web site for the "It All Adds Up" public information campaign directed at low-level ozone pollution made thirty-five print public service announcements ("PSAs") available to local communities attempting to reduce ozone precursor emissions from driving and other individual behaviors. *See* U.S. EPA, *supra note* 149. Of the thirty-five slides, only one provided information that appears targeted at awareness of consequences (that "[v]ehicles on the road account for more than 25% of all air pollution nationwide") relevant to either the environmental protection or reciprocity norm. None contained information appropriate for inducing ascription of responsibility relevant to either norm. Instead, the general strategy pursued by the PSAs is to identify specific behaviors (driving, taking the bus) as either good or bad, and to identify the other personal or economic benefits associated with certain behaviors, such as gas and time savings from walking to work or telecommuting. *Id.*

[154] *See, e.g.*, P. Wesley Schultz et al., *Who Recycles and When? A Review of Personal and Situational Factors*, 15 J. ENVTL. PSYCHOL. 105, 107 (1995) (reviewing studies that assessed knowledge of effects of recycling on "preserving the environment" and of "global environmental issues"); P. Wesley Schultz & Stuart Oskamp, *Effort as a Moderator of the Attitude-Behavior Relationship: General Environmental Concern and Recycling*, 59 SOC. PYSCHOL. Q. 375, 380–81 (1996) (examining "environmental concern").

[155] *See* Carlson, *supra* note 2, at n.26. Perhaps as a result, studies that have examined the association between beliefs about the consequences of recycling and recycling behavior have had mixed results. *See, e.g.*, Bratt, *supra* note 100, at 650 (concluding that AC, measured as "assumed consequences," does not have a significant influence on recycling); Guagnano et al., *supra* note 64, at 713 (concluding that AC and AR predict behavior for households when recycling is inconvenient, but not when it is convenient); Joseph R. Hopper & Joyce McCarl Neilsen, *Recycling as Altruistic Behavior: Normative and Behavioral Strategies to Expand Participation in a Community Recycling Program*, 23 ENV'T & BEHAV. 195, 215 (1991) (noting that block leaders did not communicate information regarding AC, but that personal norms affected recycling behavior when AC was high); P. Wesley Schultz, *Changing Behavior with Normative Feedback Interventions: A Field Experiment on Curbside Recycling*, 21 BASIC & APPLIED SOC. PSYCHOL. 25, 31 (1998) (finding no significant changes in recycling among respondents who received a plea and information but no feedback).

[156] *See* Thomas R. Schueler, *On Watershed Education*, 3 WATERSHED PROTECTION TECH. 680, *reprinted in* THE PRACTICE OF WATERSHED PROTECTION 629, 630 (Thomas R. Schueler & Heather K. Holland eds., 2000) (noting that fifty local programs directed at household runoff had budgets of $2000

aggregate and relative contributions of individuals to the environmental problems targeted by the campaign. Studies indicate that the alternative approach often taken—hortatory information that highlights individuals' personal obligation to act—can have a "boomerang effect." Instead of changing behavior, the information may induce the individual to believe that she will feel less satisfaction if she alters her behavior or to believe that her personal freedom is being restricted.[157]

Labels also typically convey little information about the mean, aggregate or relative environmental effects of product purchases.[158] This information may not be included in labels because it is difficult to obtain or because space constraints restrict the ability to convey it. Regardless of the reason, given the backdrop of current beliefs it is not surprising that labels often fail to activate norms to the extent necessary to change behavior.

3. Summary.—In sum, the limited effects of norm campaigns and product labels may not be attributable to inherent limitations in normative influence. Instead, the limited effects may be the product of a failure to convey the types of information that will activate personal norms. In the next Part, I propose a legal reform that will provide these types of information.

IV. THE IMPLICATIONS OF NORM ACTIVATION

The legal reform I propose in Part IV will generate and disseminate the information that environmental norm activation theory indicates is necessary to change behavioral intentions and behavior in many negative-payoff, loose-knit group situations. The reform is grounded in the concept of informational regulation, which scholars in recent years have described as an efficient complement to other regulatory instruments.[159] To date, much of

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to $25,000).

157 *See* PELLIKAAN & VAN DER VEEN, *supra* note 53, at 230; Schwartz, *supra* note 16, at 263–66.

158 *See, e.g.*, Menell, *supra* note 138, at 1437–41 (describing labeling schemes). Labels also are ineffective for behaviors whose environmental impact is not determined by product choices. For example, the focus of eco-labeling on the consumer's point of purchase for a vehicle will miss the effects that arise from driving style, such as driving speed and vehicle idling. A vehicle that idles more than fifteen seconds emits more of at least one pollutant than if it were turned off and re-started. *See* D. MCKENZIE-MOHR ET AL., EVALUATION OF BARRIERS TO PARTICIPATION BY INDIVIDUALS IN GHG REDUCTION ACTIVITIES (1998) (report prepared for the Public Education and Outreach Issue Table, Climate Change Secretariat, Ottowa, Ontario, Canada). An eco-label will do little to affect these types of activities.

159 *See* Cass R. Sunstein, *Informational Regulation and Informational Standing: Akins and Beyond*, 147 U. PA. L. REV. 613, 613 (1999) (calling informational regulation "one of the most striking developments in the last generation of American law"). The informational regulation scholarship has recognized that information about industrial pollution information may be considered a public good. *See id.* at 624. For a recent overview of the literature on pure and impure public goods, see Tracey E. George & Chris Guthrie, *Induced Litigation*, 98 NW. U. L. REV. 545, 548–55 (2004). The discussion of public beliefs in Part II suggests that information about the environmental consequences of individual behavior is under-supplied. *See also* Menell, *supra* note 138, at 1445 (noting that "[t]he unregulated market may fail to provide adequate information about environmental impacts of consumer choice be-

environmental informational regulation has been directed at large industrial sources,[160] although informational regulatory measures have been directed at private individuals in the norm campaigns and product labeling discussed above.[161]

I begin Part IV by asserting that an informational regulatory instrument that has only been directed at industry thus far, the Toxic Release Inventory ("TRI"), serves as a valuable model. I note that TRI provides facility-specific, as well as aggregate and relative release information for large industrial sources, and that empirical studies suggest that this information influences firm behavior. Although scholars have had difficulty identifying why TRI affects firm behavior, I argue that norm activation may be supplementing market and regulatory influences. Drawing on the TRI model, I then propose an Individual TRI that will generate and disseminate data on the mean, aggregate and relative toxic releases of individuals, and that will disseminate the data at the same time and in the same format as the TRI data.

A. The Toxic Release Inventory

Congress included the TRI requirements in section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 ("EPCRA").[162] EPCRA was enacted largely in response to the chemical disaster at Bhopal, India in 1984.[163] The TRI provisions require large industrial facilities that

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cause it is difficult to appropriate sufficient return for generating such information"); Schueler, *supra* note 156, at 634 (concluding that "[s]tudy after study indicates that product labels and store attendants are the primary and almost exclusive source of lawn care information for the average consumer").

[160] *See* Stewart, *supra* note 142, at 141. These measures typically have sought to protect individuals from risks created by industrial or other polluters rather than addressing individuals as creators of risk in their own right. Examples of these programs, which are often described as citizen "right-to-know" programs, include TRI toxic chemical reporting, California Proposition 65, *see* Michael Barsa, Note, *California's Proposition 65 and the Limits of Information Economics*, 49 STAN. L. REV. 1223 (1997), and the requirement for businesses to draft and disclose "risk management plans" regarding releases of hazardous air pollutants. *See* Clean Air Act Section 112(r), 42 U.S.C. § 7412(r) (2000).

[161] *See* discussion *supra* notes 131–144; Clifford Rechtschaffen, *The Warning Game: Evaluating Warnings Under California's Proposition 65*, 23 ECOLOGY L.Q. 303 (1996).

[162] *See* section 313 of the Emergency Planning and Community Right-to-Know Act of 1986, Pub. L. No. 99-499, 100 Stat. 1613 (1986) (codified at 42 U.S.C. § 11023(a)–(c) (2000)). EPCRA was enacted as sections 301–313 of the Superfund Authorization Reauthorization Amendments (SARA) of 1986, Pub. L. No. 99-499, 100 Stat. 1613 (1988).

[163] *See, e.g.*, Statement of Sen. Lautenberg, 131 CONG. REC. S11,664 (stating that "[s]ince the Bhopal incident, there have been a series of less serious, but significant, releases in the Unites States that suggest that we are far from immune from such dangers . . . . Our amendment is designed to improve our ability to respond to these incidents."). More than 2000 people were killed as a result of a 1984 release of methyl isocyanate from a plant owned by a Union Carbide subsidiary in Bhopal, India. *See* Bradley C. Karkkainen, *Information as Environmental Regulation: TRI and Performance Benchmarking, Precursor to a New Paradigm?*, 89 GEO. L.J. 257, 259 n.2 (2001). The tragedy received extensive media coverage. *See* LEE WILKINS, SHARED VULNERABILITY: THE MEDIA AND AMERICAN PERCEPTIONS OF THE BHOPAL DISASTER 55, 63 (1987) (noting that the New York Times printed 166 Bhopal stories and Time published twenty-seven stories).

manufacture, process, or otherwise use listed toxic chemicals in amounts above threshold levels to submit toxic release data for each listed chemical to the EPA each year.[164]

The EPA compiles the TRI information and makes it available to the public through annual summaries of toxic releases and an on-line database.[165] TRI has generated recent academic interest largely because it requires disclosure of toxic releases by regulated facilities but does not set limits on those releases. TRI thus fits squarely in the category of informational regulatory instruments directed at informing private individuals, government regulators and others of the risks posed by industrial facilities.[166] Several aspects of TRI are important for its use as a model for efforts to steer individual behavior.

1. Information Collection.—TRI requires large industrial facilities to report annually to the EPA the quantities of certain toxics released during the prior calendar year.[167] Facilities subject to TRI reporting requirements may make reasonable estimates of their releases based on "readily available data," and the EPA is prohibited from requiring regulated facilities to conduct additional monitoring to gather TRI data.[168]

TRI reporting is required for a broad, but not exhaustive, list of toxic chemicals. Congress specified a list of more than 320 chemicals that were subject to initial reporting requirements.[169] Congress also authorized the EPA to add and delete chemicals from the list,[170] and today more than 650

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[164] Section 313 requires reporting of data on the facility, the chemical manufactured, processed or used, releases of the toxic chemical, and source reduction and recycling activities. *See* 42 U.S.C. § 11023 (2000).

[165] The EPA TRI Web site can be accessed at http://www.epa.gov/tri.

[166] *See, e.g.*, DANIEL A. FARBER, ECO-PRAGMATISM: MAKING SENSIBLE ENVIRONMENTAL DECISIONS IN AN UNCERTAIN WORLD (1999); Daniel C. Esty, *Environmental Protection in the Information Age*, 79 N.Y.U. L. REV. 115 (2004); Daniel C. Esty, *Toward Optimal Environmental Governance*, 74 N.Y.U. L. REV. 1495 (1999); Karkkainen, *supra* note 163, at 334; William F. Pedersen, *Regulation and Information Disclosures: Parallel Universes and Beyond*, 25 HARV. ENVTL. L. REV. 151, 151–53 (2001); Stewart, *supra* note 142, at 24; *see also* William M. Sage, *Regulating Through Information: Disclosure Laws and American Health Care*, 99 COLUM. L. REV. 1701 (1999) (suggesting application of information disclosure to health care policy).

[167] *See* 42 U.S.C. § 11023(a) (2000) (requiring disclosure of toxic chemical releases). The EPA promulgated a final rule implementing the initial TRI reporting requirements in February 1988, and the first TRI reports were due on July 1, 1988. *See* 53 Fed. Reg. 4500 (Feb. 16, 1988) (codified at 40 C.F.R. § 372 (2003)). The Pollution Prevention Act of 1990, 42 U.S.C. §§ 11047–11049, amended EPCRA to require TRI facilities to report on toxic source reduction, recycling and treatment activities.

[168] Facilities must report the quantities of releases annually on "Form R." *See* 42 U.S.C. § 11023(a), (g); 40 C.F.R. § 372.30(a) (2003); EPA Form 9350-1 (Form R) (revised Feb. 2004), *available at* http://www.epa.gov/tri/report/Form_R_2003.pdf.

[169] *See* EPCRA section 313(c), 42 U.S.C. § 11023(c) (reporting required of "those chemicals on the list in Committee Print Number 99-169 of the Senate Committee on Environment and Public Works, titled 'Toxic Chemicals Subject to § 313 of the Emergency Planning and Community Right-To-Know Act of 1986'").

[170] *See* 42 U.S.C. § 11023(d)–(e). The EPA has deleted several chemicals from the list. *See* Dele-

toxics are subject to TRI reporting requirements.[171] Dioxin and acrolein are among the toxics on the TRI list.

The categories of facilities subject to TRI reporting also have grown since the enactment of EPCRA in 1986, but the focus has remained on large manufacturing and other industrial facilities.[172] Small facilities are excluded from TRI reporting requirements, as are many potentially significant categories of large facilities.[173] Congress has not amended the TRI provisions to change the facilities or chemicals subject to reporting, nor has Congress included additional source categories.[174] Reasons cited for excluding small generators and other sources include concern about imposing high reporting costs, the difficulty of obtaining reliable data and political viability.[175]

2. Information Dissemination.—The EPA compiles the TRI toxic chemical release information and makes it available in summary reports and in the form of raw data available on the Internet.[176] The summary reports present the data on a per-chemical, per-industry sector, regional and na-

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tion of Certain Chemicals: Toxic Chemical Release Reporting: Community Right-to-Know, 63 Fed. Reg. 19,838 (Apr. 22, 1998). The EPA has added more chemicals than it has deleted, however. *See, e.g.*, Addition of Certain Chemicals; Toxic Chemical Release Reporting: Community Right-to-Know, 59 Fed. Reg. 61,432 (Nov. 30, 1994) (adding 286 chemicals to the TRI list).

171 *See* 40 C.F.R. § 372.65 (2003); *see also* U.S. EPA, OFFICE OF ENVTL. INFO., EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW SECTION 313 LIST OF TOXIC CHEMICALS (Mar. 2001) (EPA 260-B-01-001).

172 The EPCRA reporting requirement is directed only at the "owner or operator of a facility subject to the requirements of [Section 313]." *See* EPCRA Section 313(a), 42 U.S.C. § 11023(a). It would be a stretch, at best, to suggest that a homeowner or resident is an "owner or operator" of a "facility." *See* 40 C.F.R § 372.3 (2003) (defining "facility"). Even if one could do so, section 313(b) applies to a facility only if: (1) the facility is in Standard Industrial Classification ("SIC") codes 20 through 39; (2) the facility has ten or more employees; and (3) the facility manufactured, processed, or otherwise used a toxic chemical in excess of the applicable reporting amount. EPCRA Section 313(a), 42 U.S.C. § 11023(a); *see also* Exec. Order No. 12,856, 58 Fed. Reg. 41,981 (Aug. 3, 1993) (extending the TRI reporting requirements to federal facilities). The EPA has the authority to add or delete SIC Codes subject to reporting, but only "to the extent necessary to provide that each [SIC Code] to which this section applies is relevant to the purposes of [section 313]." *See* 42 U.S.C. § 11023(b)(1)(B). Further, the EPA has stated that it lacks the authority to extend the reporting requirements to facilities with less than ten employees. Persistent Bioaccumulative Toxic (PBT) Chemicals, 64 Fed. Reg. 58,666, 58,673 (Oct. 29, 1999) [hereinafter PBT Notice].

173 For example, although the EPA added new facility categories in 1998, TRI reporting is not required for facilities in the forestry, agriculture, oil and gas extraction, transportation, or other sectors. *See* Pedersen, *supra* note 166, at 155–56.

174 The only amendment to EPCRA has been the Pollution Prevention Act of 1990. *See supra* note 167.

175 *See* Mark Cohen, *Information as a Policy Instrument in Protecting the Environment: What Have We Learned?*, 31 ENVTL. L. REP. 10,425 (2001).

176 EPCRA section 313(j) requires EPA to "establish and maintain in a computer database a national toxic chemical inventory" and to "make the data accessible by computer telecommunication and other means." EPCRA Section 313(j), 42 U.S.C. § 11002(j). The public availability of the raw data and the EPA reports lags the submission of the data by almost two years. For example, although the first reports were due on July 1, 1988, EPA first released the TRI data in March 1989.

tional basis. In addition, the data available over the Internet enable users to evaluate toxic chemical releases on a per-facility and per-firm basis, and enable searches by zip code.

The disclosure of the initial TRI data in 1989 generated massive national and local media attention.[177] For example, USA Today published a series of articles over three days that reached roughly two million readers,[178] and the ABC-TV nightly news program reported on the inventory in a series of news stories in March and June 1989.[179] The national and local media coverage has continued in subsequent years.[180] The reports typically discuss the total quantities of toxics released, comparative information among the states, industries and specific facilities, and trends over time.[181] In particular, data on the aggregate amounts of toxics released, the relative contributions of various industry sectors and regions, and changes from prior years figure prominently in the media coverage.[182]

The raw data also generate a secondary information market: they en-

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[177] *See, e.g.*, U.S. GAO, REPORT TO CONGRESS: TOXIC CHEMICALS: EPA'S TOXIC RELEASE INVENTORY IS USEFUL BUT CAN BE IMPROVED 25–26 (1991) (GAO/RCED-91-121) (noting media coverage of the early TRI data); Michael R. Greenberg et al., *Network Evening News Coverage of Environmental Risk*, 9 RISK ANALYSIS 119 (1989) (concluding that the TRI data release acted as a "news peg" for coverage of pollution by national evening news programs and major newspapers). An apparent connection between TRI reports and the media can be seen in a comparison of pollution coverage before and after the first report. During the three years immediately before the first TRI report (1986–1988) an average of 35 television stories and 1661 newspaper stories appeared on pollution each year. *Television News* Archive, *at* http://tvnews.vanderbilt.edu (maintained by Vanderbilt University); *New York Times* and *Washington Post* Archives, LEXIS (result of search for "pollution" between January 1, 1981 and December 31, 1988 in both databases). In contrast, during the three years just after the first TRI report (1989–1991) an average of 55 television stories and 2370 newspaper stories on pollution appeared each year. *Id.* (result of search for "pollution" between January 1, 1989 and December 31, 1991 in both databases).

[178] *See* U.S. GAO, *supra* note 177, at 26 (citing *Special Report: Tracking Toxics*, USA TODAY, July 31–Aug. 2, 1989).

[179] *See id.*

[180] *See* James T. O'Reilly, *Seeking a Truce in the Environmental Information Wars: Replacing Obsolete Secrecy Conflicts with New Forms of Sharing*, 30 ENVTL. L. REP. 10,203 (2000). The number of pollution stories in newspapers has consistently remained greater than it was before TRI reporting began. *New York Times* and *Washington Post* Archives, *supra* note 177 (result of search for "pollution" between January 1, 1977 and December 31, 1988 for "before" time period and between 1/1/89 and 12/31/00 for "after" time period). After an initial surge, the quantity of television coverage of pollution returned to the same level as before TRI reporting, however, for the rest of the 1990s. *Television News* Archive, *supra* note 177 (result of search for "pollution" between January 1, 1977 and December 31, 1988 for "before" time period and between January 1, 1989 and December 31, 2000 for "after" time period).

[181] *See, e.g.*, Associated Press, *Toxic Pollution Rose in 2002, Reversing Trend*, ALL NEWS, June 23, 2004, *available at* http://www.allscienctnews.net/news.html?view=8292 (noting that 4.79 billion pounds were released in 2002 and comparing the total to the total from prior years).

[182] *See id.* The legal trade press also emphasizes the aggregate and relative quantities released. *See, e.g.*, Steve Cook, *Releases of Toxic Substances Rose in 2002 by 5 Percent, According to Annual Inventory*, DAILY ENV'T REP. (BNA), June 23, 2004, at A-8 (identifying total toxic chemical releases and comparing changes by industry sector).

able government agencies, public interest groups, industry trade associations, and other organizations to prepare reports characterizing the risks posed by the TRI-reported toxic chemical releases. These reports often generate additional media attention, and are used in industry-, facility-, and pollutant-focused campaigns. One recent example is a U.S. Public Interest Research Group analysis of the emissions of industrial chemicals suspected of causing developmental problems and birth defects in children.[183] The study used 1987-2000 TRI data to rank states based on emissions of certain toxics. The study generated extensive media attention.[184] For example, one newspaper headline stated that the state in which the newspaper is located "leads in toxic emissions suspected in birth defects," and the text indicated that the state "tops the nation in emissions of industrial chemicals suspected of causing birth defects and developmental problems in children."[185] In contrast, industries use the TRI data to tout improvements in environmental performance.[186]

Individuals can access the TRI data through a publicly available database maintained on the Internet by the EPA.[187] Non-profit organizations such as Environmental Defense and RTK Net also make the TRI data available over the Internet in easily accessible formats that allow private individuals to identify the TRI-reporting facilities and toxics released within their zip code or other geographic area.[188] In addition, private fee-based services also prepare reports that combine TRI data with enforcement, permitting and other information.[189] In sum, TRI enables a wide range of parties to obtain data on the quantities of toxics released from TRI-reporting facilities, to compare quantities released on a per-facility, per-industry, or per-area basis, and to examine trends over time.

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183 *See* TONY DUTZIK ET AL., TOXIC RELEASES AND HEALTH: A REVIEW OF POLLUTION DATA AND CURRENT KNOWLEDGE ON THE HEALTH EFFECTS OF TOXIC CHEMICALS (2003).

184 *See, e.g.*, Holly Edwards, *Tennessee Leads in Toxic Emissions Suspected in Birth Defects, Study Says*, TENNESSEAN, Jan. 29, 2003, at 1A; Jane Spencer, *Group Maps Pollutants by ZIP Code*, WALL ST. J., Jan. 23, 2003, at D3; *see also* Schueler, *supra* note 156, at 631 (noting that commercial television, radio, and newspapers are far more effective than other sources, and that newspaper stories in the local section of the paper had no effect).

185 Edwards, *supra* note 184, at 1A.

186 *See* discussion *infra* note 218.

187 *See, e.g.*, U.S. EPA, Envirofacts Data Warehouse, *at* http://www.epa.gov/enviro/html/qmr.html (last updated Dec. 22, 2004).

188 *See, e.g.*, Envtl. Def., Pollution in Your Community, *at* http://www.scorecard.org (last visited Jan. 22, 2005); OMB Watch, RTK Net: The Right-to-Know Network, *at* http://www.rtk.net (last visited Jan. 22, 2005).

189 *See, e.g.*, Envtl. Data Res., Inc., Reporting for Environmental Site Assessments ("ESAs"), *at* http://www.edrnet.com (last visited Jan. 22, 2005). These reports facilitate the conduct of environmental due diligence and are commonly used in commercial property, merger and acquisition, lending, and other transactions. The data also provide a means of monitoring the environmental performance of debtors, insureds and indemnitors. *See* Karkkainen, *supra* note 163, at 323 (discussing effects on insurers and lenders).

3. The Effects of TRI Information.—The TRI information-based approach has influenced both regulatory decisionmaking and the environmental performance of firms.[190] TRI has influenced regulatory decisionmaking by providing new information on industrial toxic chemical releases that facilitates the allocation of risk reduction resources.[191] The initial TRI disclosures indicated that billions of pounds of toxics were released in 1987, and EPA officials were surprised by the quantities of toxics released.[192] Since that time, federal, state and local policymakers have used the TRI data not only as a starting point to focus legislative, regulatory and enforcement efforts on potentially important industrial sources, but also in the development of voluntary reduction programs.[193] The TRI information also facilitates efforts by interest groups and individual citizens to influence government decisionmaking.

The TRI data also appear to have induced firms to reduce toxic releases. According to the EPA, releases of the toxic chemicals included in the original 1988 TRI list decreased 48% between 1988 and 2000. The extent to which these reductions in toxic releases are attributable to TRI, as opposed to regulatory or other influences, is difficult to assess,[194] but several studies do suggest that the release of TRI data has induced firms to reduce toxic emissions over and above regulatory requirements.[195]

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[190] *See* Cohen, *supra* note 174, at 10,426–28. The TRI approach also has been widely emulated in other countries. *See, e.g.*, European Env't Agency, European Pollutant Emission Register, *available at* http://www.eper.cec.eu.int/eper/default.asp (last visited Jan. 22, 2005); *see also* Rod Hunter & Koen Muylle, *European Community Environmental Law: Environmental Legislation*, 29 ENVTL. L. REP. 10,297 (1999).

[191] *See* Pedersen, *supra* note 166, at 151, 183; Sunstein, *supra* note 159, at 625; *see also* Michael C. Dorf & Charles F. Sabel, *A Constitution of Democratic Experimentalism*, 98 COLUM. L. REV. 267 (1998) (describing TRI as a form of "democratic experimentalism").

[192] *See* ROBERT V. PERCIVAL ET AL., ENVIRONMENTAL REGULATION: LAW, SCIENCE, AND POLICY 337 (4th ed. 2003) (noting that EPA Assistant Administrator Linda Fisher described the quantities released as "startling" and "'far beyond EPA's' expectations" (citation omitted)).

[193] For example, according to the General Accounting Office, TRI data contributed to the inclusion of new air toxics regulations in the 1990 Clean Air Act Amendments. *See* U.S. GAO, *supra* note 177, at 20 (noting that "[a]ir emissions data from the inventory contributed to the Congress' decision to regulate more toxic chemicals under the 1990 Clean Air Act Amendments"); *see also* Steven J. Christiansen & Stephen H. Uruqhart, *The Emergency Planning and Right to Know Act of 1986: Analysis and Update*, 6 BYU J. PUB. L. 235, 253 (1992) (noting that EPA has used the TRI data to cross-check air emissions reporting, develop air toxics source categories lists, to target potentially responsible parties under the Superfund program, and to assess long term industry trends regarding hazardous wastes).

[194] *See* U.S. EPA, *supra* note 11, at 3-8-9 (noting that seven billion pounds of toxic chemicals were released in 2000, and thirty-one billion pounds were "managed," either by treatment (50%), recycling (39%), or burning (11%), and therefore were not included in the release total).

[195] TRI data appear to influence share value and the environmental performance of firms that have high toxic emissions relative to peers in their industry sector. *See* James T. Hamilton, *Pollution as News: Media and Stock Market Reactions to the Toxics Release Inventory Data*, 28 J. ENVTL. ECON. & MGMT. 98 (1995); Shameek Konar & Mark A. Cohen, *Does the Market Value Environmental Performance?*, 83 REV. ECON. & STAT. 281, 289 (2001) (concluding that the effect on intangible asset value of TRI emissions levels are statistically and economically significant). In one study, the firms that had the

TRI-generated information may affect private firms for a number of reasons, but the causes are not well understood.[196] For example, shareholders may view large quantities of TRI-reported releases as indicative of undisclosed environmental liabilities, increased risk of future government regulatory or enforcement targeting, inefficient resource use or lax management generally. Firm managers also may perceive that large quantities of toxic releases increase the risk of government enforcement actions, toxic tort or citizen suits, or citizen activism generally, which in turn may increase compliance costs, affect demand for the firm's products or affect the willingness of government agencies to grant permits or provide other services.[197] The TRI data also may simply provide the information necessary for firm managers to manage more efficiently.[198]

Environmental norm activation theory provides an additional explanation for the influence of TRI on firm behavior. In particular, the theory suggests that TRI provides the type of facility-specific, aggregate and relative information that is likely to activate the environmental protection and reciprocity norms. Although the TRI data identify the facility-specific and aggregate quantities of toxics released by industry sector or geographic region, not the environmental effects of those releases, the TRI data nevertheless may lead to environmental protection norm activation either directly based on the quantity data or as a result of the characterizations of the environmental effects of those quantities in the secondary information market. Similarly, by enabling comparisons of the relative quantities of toxics released (e.g., by firms within an industrial sector, or by sector, or by geographic region) in any one year and over time, the TRI data provide the information necessary to assess the relative contribution of the source or source category, and thus to activate the reciprocity norm. The norms affected may be those of shareholders, directors, managers and other employees, local community members, or others.[199] The influence of TRI data on

largest negative stock price returns following the initial release of TRI data also were found to have reduced their emissions more than other firms. *See* Shameek Konar & Mark A. Cohen, *Information as Regulation: The Effect of Community Right to Know Laws on Toxic Emission*, 32 J. ENVTL. ECON. & MGMT. 109 (1997); *see also* James Hamilton, *Is the Toxics Release Inventory News to Investors?*, 16 NAT. RESOURCES & ENVT. 292 (2001). For a recent review of the literature, see Cohen, *supra* note 175, *at* 10,425–28.

196 *See* Cohen, *supra* note 175, at 10,425 (concluding that "[w]hat is not fully understood . . . is the mechanism by which these programs induce firms to voluntarily reduce emissions beyond any legal requirement").

197 *Id.* at 10,425–26.

198 *See* Karkkainan, *supra* note 163, at 295–304. In particular, the TRI data facilitate evaluation of facility and firm environmental performance using standard units of measurement and data that can be used to compare performance across facilities, firms, sectors, communities, or states and to compare the performance over time and across types of toxics. The TRI data also provide performance baselines firm managers can use to improve toxics management. *Id.* at 261.

199 The influence of TRI data on the personal norms of firm managers is a plausible but as-yet untested explanation for the effect of TRI data on firm behavior. *See* Stewart, *supra* note 142, at 142; Vandenbergh, *supra* note 54, at 138. Studies suggest that the focus of CEOs on pecuniary performance

personal norms is difficult to isolate and study empirically, but norm effects may provide an important additional explanation for firms' reductions in toxic releases following the disclosure of the data.

B. The Individual Toxic Release Inventory

The TRI release-reporting concept provides a model for legal reforms that use information to steer individual behavior. In particular, release reporting can be directed at individual behavior in a way that will effectively, and with little initial public support, provide the types of information necessary to activate norms. Norm activation, in turn, will begin the process of changing direct and civic individual behavior in the types of negative-payoff, loose-knit group situations that norms studies have found to be the most resistant to change.

1. TRI Amendments.—The EPA has not required individuals and households to complete the TRI reporting form for toxic chemical releases, and EPCRA does not appear to authorize the EPA to do so. The statutory language provided in EPCRA section 313 limits reporting to large industrial facilities.[200] Furthermore, to the extent the EPA has interpreted section 313

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has a large influence on the environmental behavior of corporate firms, *see* Charles W.L. Hill et al., *An Empirical Examination of the Causes of Corporate Wrongdoing in the United States*, 45 HUM. REL. 1055, 1072 (1992), but studies of business managers also suggest that in some situations personal norms may have a greater influence on their decisionmaking than pecuniary factors or externally-enforced social norms. *See, e.g.*, Raymond Paternoster & Sally Simpson, *Sanction Threats and Appeals to Morality: Testing a Rational Choice Model of Corporate Crime*, 30 L. & SOC'Y REV. 549, 575–76 (1996). Although no quantitative empirical study has analyzed the effect of TRI data on the personal norms of CEOs and other top business managers, anecdotal information suggests that personal norms are activated by the release of the data and the attendant media reporting. *See* Pedersen, *supra* note 166, at 162 n.46. The TRI information also may activate personal norms held by community residents against polluters, inducing activists and others to levy economic sanctions on firms and social sanctions on firm employees.

[200] *See* discussion *supra* notes 172–175. The statutory reporting thresholds are the manufacture or processing of more than 25,000 pounds of TRI-listed substances or the use of more than 10,000 pounds of these substances. *See* 42 U.S.C. § 11023(b)(1)(A) (2000). EPA has provided a less stringent threshold of one million pounds manufactured or processed for facilities with reportable releases of less than 500 pounds annually. *See* Alternate Threshold for Facilities with Low Annual Reportable Amounts; Toxic Chemical Release Reporting; Community Right-to-Know, 59 Fed. Reg. 61,488 (Nov. 30, 1994) (codified at 40 C.F.R. § 372.27 (2002)). EPA has the authority to set lower reporting thresholds and has done so for certain persistent chemicals, but for the most part these thresholds exclude many smaller facilities. *See* EPCRA Section 313(f), 42 U.S.C. § 11023(f); PBT Notice, *supra* note 172, at 58,666; *see also* Arnold W. Reitze, Jr. & Steven D. Schell, *Self-monitoring and Self-reporting of Routine Air Pollution Releases*, 24 COLUM. J. ENVTL. L. 63 (1999). The EPA has explicit statutory authority to expand the scope of the facilities subject to TRI reporting in two ways. First, for specific facilities, the statutory language provides for the Administrator to "apply the requirements of this section to the owners and operators of any particular facility that manufactures, processes, or otherwise uses a toxic chemical," based on the toxicity of the chemical, proximity of the facility to population centers, or other factors. *See* EPCRA Section 313(b)(2), 42 U.S.C. § 11023(b)(2). Second, the statutory language authorizes the EPA to add or delete SIC Codes subject to reporting, but only "to the extent necessary to provide that each [SIC] Code to which this section applies is relevant to the purposes of [section 313]." *See* EPCRA Sec-

in ways that are relevant to individuals, it has done so by excluding individuals' activities that occur within the facilities that are already subject to TRI reporting.[201]

Similarly, the legislative history of EPCRA does not indicate that Congress intended to require or authorize EPA to gather data on the toxic releases from individuals and households.[202] The Bhopal disaster, a smaller release at Institute, West Virginia, and other sudden industrial releases were the principal focus of the legislative debate over EPCRA.[203] The focus on Bhopal-type disasters framed the issue around acute, catastrophic industrial accidents and directed attention away from sources of chronic releases, such as private individuals. Furthermore, the notion that information gathering would occur through burdensome reporting forms then facilitated an odd alliance of political interests against broadening TRI to include small sources.[204]

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tion 313(b)(1)(B), 42 U.S.C. § 11023(b)(1)(B). EPCRA section 313 thus provides EPA with broad authority to add particular facilities or groups of facilities within new SIC Codes, but the authority appears limited to "facilities," leaving little room to argue that the EPA could add individuals or households to the reporting requirements.

[201] *See* 40 C.F.R. § 372.48(c)(3) (2003) (excluding "[p]ersonal uses by employees or other persons at the facility . . . of . . . items containing [listed] toxic chemicals").

[202] The House conference report suggests that Congress did not envision extending reporting to retail facilities, much less to individuals. In addressing the scope of the EPA's authority to add to or remove facilities to the list of those subject to TRI reporting requirements, the report provides that:

> For example, facilities within SIC code 2875 mix or blend for sale at the retail level various fertilizer products in response to specific customer needs. They may fall within SIC codes 20 through 39 because this activity may be classified as a "mixing or blending," which generally is a manufacturing activity. Yet, given the retail context and the nature of the blending and mixing done by these specific facilities, reporting by such facilities may not be appropriate. Subparagraph 313(b)(1)(B) is intended to provide EPA the authority to address issues regarding the coverage of such facilities.

H.R. REP. NO. 99-962, at 292–93 (1986), *reprinted in* 1986 U.S.C.C.A.N. 3276, 3276–77.

[203] *See, e.g.*, *Toxic Release Control Act of 1985: Hearing on H.R. 2576 Before the House Subcomm. on Heath and the Env't of the House Comm. on Energy and Commerce*, 99th Cong. 5, 9 (1985) [hereinafter *Hearing*] (statement of Rep. Florio).

[204] Advocates of broad toxic release reporting sought to keep the focus of the legislation on industrial sources, whereas opponents highlighted the burdens of release reporting on small sources in an effort to defeat or narrow the overall scope of the legislation. The legislative history of the Toxic Release Control Act of 1985, a predecessor to EPCRA, provides an example of the debate over the language that was ultimately enacted as the TRI provisions of EPCRA. Rep. Henry Waxman, a sponsor of the bill and advocate of industrial release reporting, opined at the beginning of the hearing that, "the undeniable truth is that chemical plants . . . are America's greatest toxic air hazard." *Hearing*, *supra* note 203, at 5 (statement of Rep. Waxman). In contrast, opponents of stringent industrial toxic release reporting requirements responded in part by pointing to the importance of releases by non-industrial sources and the burdens of imposing release-reporting requirements on these sources. *See, e.g.*, 131 CONG. REC. H11,206 (daily ed. Dec. 5, 1985) (statement of Rep. Ritter) (suggesting that "the air pollution figures EPA is coming up with, first of all, pale in comparison to what we do to ourselves by polluting the air by smoking, or by exposure to indoor air, but we did hold hearings on this; the larger percentage of pollution comes from a wide variety of sources, and less from the point sources which are being added in the amendment"). Opponents of expansive industrial toxic release reporting pointed to the existence of individual behavior as a source of toxic releases, but did so not to add individuals to the reporting scheme,

It is tempting to propose that the EPA simply collect and report data on individual and household emissions on its own initiative, without congressional authorization. A statutory amendment to the TRI provisions of EPCRA, however, is preferable for several reasons. First, putting aside EPCRA section 313, it is unclear whether the EPA has the inherent authority to collect data on individual releases of toxics.[205] Second, even if the EPA has the authority to gather new information on toxic releases by individuals, Congress is the most likely branch of government to oversee the Agency's information collection and dissemination activities, and there is little reason to believe that unilateral action by the EPA would be well received or adequately funded.[206] Third, the media coverage of the legislative process may raise awareness of the issue, and the enactment of the legislation may have expressive effects, signaling the importance of learning more about, if not reducing, individual emissions.[207] For these reasons, a statutory amendment requiring the EPA to expand the TRI release reporting concept to individuals and households is preferable.

2. Information Collection.—Collection and dissemination of information on individual toxic chemical releases could occur at low cost, with little intrusiveness, and in ways that are both administratively and politically feasible. The TRI model suggests one approach to individual release reporting: requiring individuals or households to complete and submit an-

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but to argue against adoption of broad industry requirements. *See, e.g.*, 131 CONG. REC. H11,202 (daily ed. Dec 5, 1985) (statement of Rep. Ritter) (asserting that "[t]o show you how enormous [the list of toxics] is, let us consider the chemicals contained in your Thanksgiving dinner menu . . . . Because these chemicals are present, we don't call [for] an inventory of them by the Federal Government"); *see also id.* at H11,205 (statement of Rep. Ritter) (suggesting in opposition to an amendment expanding reporting requirements that "according to the gentleman from Minnesota [Rep. Sikorski], we should require an inventory of chemicals in Thanksgiving dinner" and asserting that toxic air pollution "is due more to combustion source emissions, due to the general automobile emissions, fireplace and boiler and gas station emissions").

205 *See, e.g.*, Pedersen, *supra* note 166, at 171–72 (noting that federal agencies have asserted that they have the general authority to gather and report on data and suggesting that "fragmentary case law makes clear that absent special factors, courts will not oversee agency decisions on how to publish and publicize information that they already possess" (citing Ernest Gellhorn, *Adverse Publicity by Administrative Agencies*, 86 HARV. L. REV. 1380, 1384 (1973))).

206 *See* Vandenbergh, *supra* note 3, at 622–26. The argument that the EPA should unilaterally expand TRI reporting requirements to individuals underestimates the ability of a hostile Congress to cut budgets, use appropriations riders to bar specific actions, or place holds on appointments. These efforts may still occur even if Congress has explicitly authorized EPA action regarding individual toxic release reporting but authorization may reduce the severity of these efforts.

207 *See, e.g.*, McAdams, *supra* note 2, at 403 (noting that "[w]hen the media widely covers a legislative battle and the public perceives that the outcome is dictated largely by popularity, the resulting enactment provides convincing evidence of a societal consensus"); Stern et al., *supra* note 82, at 219 (noting that "political battles over funds for monitoring, environmental hazards, research on the epidemiology of pollution, and so forth, can affect the strength of support for the environmental movement. Because these activities tend to highlight the consequences of pollution and identify the responsible parties, they have the potential to activate norms against pollution").

nually an individual version of Form R, the toxic release reporting form currently submitted only by large industrial firms.[208] The process of completing the form would force individuals to confront their role as polluters on an annual basis, but the costs in time, intrusiveness and enforcement of this reporting requirement weigh against it.[209] Furthermore, even if a reporting scheme could be adopted, the backlash against the reporting burden could well undermine its beneficial effects.

A second approach holds much better prospects for success: Congress could amend the TRI provisions of EPCRA to create an Individual Toxics Release Inventory or ITRI. The ITRI amendments would encompass the toxics that are now subject to TRI reporting by industrial facilities and the approach of disclosing quantities of chemicals released rather than trying to restrict their release. Rather than imposing TRI-type reporting requirements on individuals, however, the ITRI would require the EPA to gather toxic release information by conducting an annual survey of individuals and households.[210] Telephone or other surveys using representative samples can generate valuable results at remarkably low cost.[211] Although individuals are often not aware of the toxics they release, the surveys would gather information on individual and household activity types and levels (e.g., quantity of household chemicals used, and hours of lawn and garden equipment use), and would be conducted with a sufficiently large sample size to enable state-by-state and regional variations to be detected. The survey results would be validated with more intensive, qualitative studies to ensure that biases in survey responses are identified and corrected.

The EPA would then use emissions factors (e.g., the pounds of pollutant X released per hour of lawnmower use or vehicle mile traveled) to cal-

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[208] The reporting form could simply require estimates of activity types and levels (e.g., driving, energy use, household chemical use) and could provide emissions factors to convert the activity types and levels into estimates of toxic chemical emissions.

[209] In fact, an approach like this was considered and rejected by Eric Orts. According to Orts, "[a] reflexive environmental law might require each citizen to report the 'environmental impact' of the individual or family in the past year." Orts, *supra* note 141, at 1268. Orts noted that such a required annual disclosure might "increase the amount of self-reflection and social communication concerning serious environmental issues." *Id.* Orts ultimately concluded that such an approach would be impractical for individuals and families. *Id.* The EPA estimates that large industrial facilities require fifty-two hours to complete Form R, although surveys of industry behavior suggest that the actual time may be closer to eighteen hours. *See* U.S. EPA, TOXIC CHEMICAL RELEASE INVENTORY REPORTING FORMS AND INSTRUCTIONS, REVISED 1999 VERSION xi (2000) (EPA 745-B-00-001) [hereinafter U.S. EPA, TRI INSTRUCTIONS]; U.S. EPA, 1996 TOXIC RELEASE INVENTORY DATA QUALITY REPORT vii, 7-5 to 7-7 (1998) (EPA-745-R-98-016). According to the United States Census Bureau, there were more than 105 million households in the United States in 2000. *See* U.S. Census Bureau, American Fact Finder, QT-P10, Households and Families: 2000, *at* http://factfinder.census.gov (last visited Aug. 15, 2004). Requiring individuals to report thus would require hundreds of millions of hours.

[210] *See* Pedersen, *supra* note 166, at 153, 168–69 (proposing small business toxics survey).

[211] A telephone survey with thirty questions and several thousand respondents could be performed for under $100,000. Telephone Interview with Renee Stiles, Assistant Professor, Center for Health Services Research, Vanderbilt University Medical School (July 9, 2004).

culate the mean individual and household toxic chemical releases, and the aggregate across all individuals. Emissions factors are a common means for assessing toxic chemical releases. For example, the EPA often uses emissions factors to estimate industrial and mobile source air emissions and industrial facilities use emissions factors to estimate TRI releases.[212] Emissions factors also have been used by organizations ranging from the United Nations Institute for Training and Research, which has published a guidance on the use of emissions factors for estimating individual and household contributions to water pollution,[213] to various non-profit groups, which have used emissions factors to develop assessments of the environmental effects of certain consumer and other individual behaviors.[214]

3. Information Dissemination.—The ITRI would require the EPA to compile and disseminate several types of information for each toxic chemical: (1) mean individual and household releases; (2) aggregate releases from all individuals; and (3) the types of individual behaviors that release the largest quantities. The ITRI also would require the EPA to provide the data in a format that would enable comparisons of the aggregate individual releases with the industrial releases currently subject to TRI reporting requirements. For example, the EPA would present the data in a way that would facilitate comparisons of the relative quantities released by industry in the aggregate and individuals in the aggregate, as well as comparisons among individuals in the aggregate and various industrial sectors (e.g., a comparison of the quantities of dioxin released by all individuals as compared to all pulp and paper mills).[215] In addition, the EPA would provide

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[212] *See* U.S. EPA, Compilation of Air Pollutant Emission Factors, *at* http://www.epa.gov/oms/ap42.htm (last visited July 9, 2004). The EPA has estimated that emissions factors are used to estimate approximately 80% of the air pollutant emissions reported nationally pursuant to Clean Air Act requirements. *See* U.S. GAO, AIR POLLUTION: EPA SHOULD IMPROVE OVERSIGHT OF EMISSIONS REPORTING BY LARGE FACILITIES 3 (2001) (GAO-01-46). For a discussion of the use of emissions factors to calculate TRI emissions by industrial facilities, see U.S. EPA, TRI INSTRUCTIONS, *supra* note 209, at 57–62. EPCRA section 313 enables regulated facilities to base reports of toxic chemical releases on "readily available data" from monitoring required under other legal requirements, or to develop "reasonable estimates of the amounts involved" and prohibits EPA from requiring that regulated facilities conduct additional monitoring to develop the data on releases of toxic chemicals. *See* EPCRA Section 313(g)(2), 42 U.S.C. § 11023(g)(2) (2000).

[213] U.N. INST. FOR TRAINING AND RESEARCH ("UNITAR"), GUIDANCE ON ESTIMATING NON-POINT SOURCE EMISSIONS 7 (1998). The UNITAR Guidance provides a methodology for estimating toxics in non-point sources of water pollution. The Guidance defines non-point sources to include "product use by consumers" and other sources. The Guidance suggests that although it is difficult, if not impossible, to measure directly the contribution of domestic activities and consumer products to the total emissions of a country or region, good estimates can be made based on available data. *Id.* at 11.

[214] Several public interest groups have published books that discuss the environmental effects of consumer behavior, and several maintain Web-based emissions calculators at which individuals can learn information about their environmental impacts based on their consumption patterns. *See* Vandenbergh, *supra* note 3, at 537; *see also* Airhead, *at* http://www.airhead.org (last visited July 9, 2004).

[215] Even if only backyard barrel burning were attributed to individuals, the 2004 comparison would be individuals, 628 gTEQ, pulp and paper mills, 12 gTEQ. *See* DIOXIN REPORT, *supra* note 5, at A28.

the mean, aggregate and relative data on a state-by-state and regional basis. The data would be released each year in a format that would not only facilitate comparisons among source categories and regions, but also trends over time.

The ITRI also would require the EPA to release the individual data at the same time and in the same documents as the current TRI large industrial facility data. Once the EPA has published the data, the mass media then will have incentives to include the new ITRI information in the annual toxic release stories that currently only report on industrial TRI emissions. By piggybacking on the news peg formed by the annual TRI data, the ITRI will receive widespread newspaper, television and radio coverage.

The ITRI data also will stimulate a secondary market for environmental information. Government agencies will be able to include the data in reports on the quantities and sources of toxic releases. These reports now often ignore individual behavior as a source category altogether or include only qualitative estimates.[216] Environmental and industry interest groups will be able to use the data in reports targeted at the public and policymakers.

To focus the public debate on the most important toxics, the ITRI ideally would include information about risk creation, not just the quantities of toxics released. As with data on the risk created by industrial toxic releases, however, publishing data about individual and household risk creation often would require information that is currently unavailable. Nevertheless, identifying quantities released is an important first step in the process of assessing the risks posed by individual behavior.[217] The ITRI data will provide a starting point for academicians, government agencies and interest groups to prepare and debate risk characterizations and to evaluate trends over time.[218]

In addition, although the ITRI will only provide a starting point for a vigorous debate about the risks created by individual behavior, there are a number of reasons to believe that those risks will be well worth debating.[219]

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[216] *See, e.g.*, discussion *infra* notes 222–223, 251.

[217] *See* NAT'L RESEARCH COUNCIL OF THE NAT'L ACADS., OIL IN THE SEA III: INPUTS, FATES, AND EFFECTS 17 (2003) [hereinafter NRC, 2003 OIL REPORT].

[218] For examples of how different organizations characterize the risks posed by TRI releases, compare WE Energies, Toxics Release Inventory, *at* http://www.we-energies.com/environment/initiatives/tri.htm (last visited June 21, 2004) (characterizing risks of firms' TRI releases and linking to the Harvard Center for Risk Analysis Web site), with OMB Watch, *supra* note 188 (RTK Net project). Congress also could direct EPA or the National Academy of Sciences to work on a parallel track to prepare a more comprehensive summary of the environmental impacts of individuals and households across a wide range of pollutants and activities, rather than simply toxics, and to begin to assess and disclose risk information.

[219] Ultimately decisions should be made based on risk, and quantities of toxic releases are only a proxy for risk creation. In fact, much of the criticism regarding TRI from business interests and scholars has focused on the fact that TRI data identify amounts of toxics released, rather than the risk to human health and the environment caused by those releases. *See, e.g.*, George Gray, *Toxic Pollution from Power Plants: Large Emissions, Little Risk*, 7 RISK PERSP. 1 (1999) (stating that "[c]hemical use does

The toxics regulatory regime has focused to a great extent on the exposure of workers to toxics in the workplace,[220] and to non-workers who may live at the fence-line of large industrial facilities,[221] but risk assessors are only beginning to focus on the effects of many pollutants released by individual behavior.[222] Despite the limited attention directed at individual behavior to date, a number of government studies have reached conclusions from which one can infer that the risks arising from individual behavior often equal or exceed the risks arising from industrial sources.[223]

Several characteristics of toxic chemical releases by individuals also suggest that the releases often pose equal or greater risks as compared to releases of the same quantity from industrial sources. First, the release of a particular quantity of a toxic by an individual often will result in greater exposure because the releases generally occur in close proximity to other individuals, such as in the home. Measured levels of pollutants in the air inside homes have exceeded by several times the levels in the ambient air, and indoor air pollution is a leading human exposure route for many toxics.[224] Emissions from vehicles on the highway may have a similar ef-

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not equal chemical risk" and "simply knowing how many pounds are used provides no information about health or environmental risks"). But data on the quantities of a chemical released are valuable, however, as a starting point in the analysis. *See* NRC, 2003 OIL REPORT, *supra* note 217, at ix (noting that quantitative data provide a baseline and guide for further studies). In addition, complete information often is not available under the scientific, financial, and political constraints faced by EPA; thus, a requirement to provide a full risk analysis in some cases will not lead to more rational risk regulation. Congressional dissatisfaction with the progress of risk-based air toxics regulation prior to Bhopal was captured in a floor statement by Rep. Sikorski, one of the sponsors of the legislation that became EPCRA:

> Now, despite section 112 in the Clean Air Act that the EPA says does not even apply to methyl isocyanate, the chemical in Bhopal, despite two decades of regulation of toxic substances, despite thousands of files of accumulated data about them . . . we still cannot answer basic questions about even the most common and deadly toxic chemicals.

131 CONG. REC. H11,205 (1985) (statement of Rep. Sikorski). Nevertheless, it is hard to argue that some type of risk-tiering could not be added to the new ITRI without too much cost. *See, e.g.*, Note, *New Regulations Under the TRI: The Need for a Tiered Approach*, 1 ENVTL. LAW. 859, 866 (1995) (advocating TRI risk-tiering). In fact, the private market for toxics information has already begun to respond to this demand to some extent. *See* Envtl. Def., *supra* note 188 (allowing TRI data to be sorted using a risk screen).

220 *See* Occupational Safety and Health Act, 29 U.S.C. §§ 651–678 (2000).

221 *See* Clean Air Act Section 112(f)(2)(A), 42 U.S.C. § 7412(f)(2)(A) (2000) (requiring reduction in excess lifetime cancer risk to "the individual most exposed to emissions").

222 *See* U.S. EPA, *supra* note 39, at 6 (noting that "personal exposure" is a growing focus of EPA research).

223 *See* discussion *supra* notes 6–11, 35–44. For example, EPA has concluded that urban runoff constitutes one of the leading sources of water quality impairment in the United States, *see, e.g.*, U.S. EPA, NATIONAL WATER QUALITY INVENTORY 2000 REPORT 31 (2001), *available at* http://www.epa.gov/305b/2000report/chp4.pdf. In addition, a leading EPA study of non-point pollution concluded that the water quality of water bodies that receive runoff from residential areas is not different from the water quality of water bodies that receive runoff from industrial areas. *See* U.S. EPA, RESULTS OF THE NATIONWIDE URBAN RUNOFF PROGRAM, VOLUME I – FINAL REPORT 6–28, 6–31 (1983).

224 The EPA Total Exposure Assessment Methodology project conducted studies that concluded

fect. As cars drive down the road, the emissions from other cars enter the ventilation systems, and one study concluded that the levels of some air pollutants inside motor vehicles exceed the levels in the ambient air.[225] Similarly, a recent study found that personal exposure levels were higher than either indoor or outdoor air levels as a result of driving and the use of consumer and hobby chemicals. This is the finding that prompted the researcher to note the "personal cloud" effect discussed in Part I.[226]

Second, toxic chemical releases by individuals often occur in locations that are more likely to result in exposure to sensitive subpopulations or ecosystems. For example, children and other sensitive subpopulations may be more likely to breathe indoor air or the air inside a motor vehicle than to breathe air contaminated by air toxics released from a distant factory.[227] In addition, individual toxic releases by individuals also often occur in sensitive ecosystems. For example, personal watercraft release petroleum in various ways and are often used in estuaries that are particularly vulnerable to petroleum contamination.[228] In sum, many releases from individuals may have a greater effect on human health and environmental quality than releases of similar quantities from other sources.

4. Feasibility—

a. Administrative feasibility.—The proposed TRI amendments will require the EPA to take steps that are well within current Agency capabilities. The preparation and publication of an annual survey of individual and household toxic releases should not be unduly expensive or difficult to administer. In fact, the Dutch have developed a release reporting scheme

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that levels of roughly a dozen organic pollutants are between two and five times higher in household indoor air than outside, and the conclusion held without regard to whether the homes were located in highly industrial areas or rural areas. *See* U.S. EPA, THE INSIDE STORY: A GUIDE TO INDOOR AIR QUALITY 12 (1995), *available at* http://www.epa.gov/iaq/pubs/insidest.html#Look7. Furthermore, the EPA estimates that 75% of homes use some form of pesticide indoors during a year, although the amounts and specific types are unknown. *Id.* at 14; *see also* California Indoor Air Quality Program, *at* http://www.cal-iaq.org (last visited Jan. 22, 2005); U.S. EPA, *supra* note 11, at 1–10 (listing several possible sources of indoor air pollution); Univ. of Minn., Home Indoor Air Quality Know Base (listing additional sources), *at* http://www.dehs.umn.edu/homeiaq/homeiaq.html (last visited Jan. 22, 2005). In addition, private individuals may expose themselves to toxics more than those who are trained to handle toxics. *See* Barry Lewis, *Nonpoint Sources, Part Two: Lifestyle Decisions Can Have Serious Effects*, *in* KNOW YOUR ENVIRONMENT 2 (May 1996) (The Academy of Natural Sciences), *at* http://www.acnatsci.org/research/kye/10nps2.html.

225 *See* Rodes et al., *supra* note 43 (concluding that some toxics inside vehicles exceed ambient levels).

226 *See* U.S. EPA, *supra* note 39, at 13.

227 For an analysis of risks posed to children, see U.S. EPA, AMERICA'S CHILDREN AND THE ENVIRONMENT: MEASURES OF CONTAMINANTS, BODY BURDENS, AND ILLNESSES (2003). There is a growing consensus that children develop some types of diseases at lower exposure levels than do adults. *See* U.S. EPA, SCI. ADVISORY BD., REVIEW OF EPA'S DRAFT SUPPLEMENTAL GUIDANCE FOR ASSESSING CANCER SUSCEPTIBILITY FROM EARLY-LIFE EXPOSURE TO CARCINOGENS ii (Mar. 3, 2004).

228 *See* NRC, 2003 OIL REPORT, *supra* note 217, at 21–22.

that takes a significant step in this direction. The Dutch equivalent of the TRI, the Pollutant Emission Register (PER), requires the national environmental agency to prepare and publish an annual profile of environmental emissions of toxic chemicals and other pollutants.[229] Although the PER does not include individual behavior as a discrete source category, it does require the environmental agency to include data on the environmental emissions from households along with the data on the releases from a number of industrial and non-industrial sources, such as small businesses, farms, and the transportation sector.[230] The PER obtains data on small and medium-sized enterprises using statistical information, localized activity rates, emissions factors, and surveys in some instances.[231]

Although the Dutch PER demonstrates that a release reporting scheme regarding households is administratively feasible, the PER does not profile individual toxic releases as would the ITRI. For example, because the Dutch PER includes households but does not include individuals as a discrete source category, it does not attribute to individuals or households the emissions from private motor vehicle use. These emissions are attributed to the transportation sector, thus the totals understate the contributions of individuals if they are treated as a discrete source category.[232]

The exclusion of transportation emissions from the household or individual category in the Dutch PER also points out perhaps the most difficult conceptual challenge for the design of the ITRI: allocating toxic chemical emissions that can be attributed to individuals or to other sources, such as the large industrial facilities that supply consumer products. To draw lines,

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[229] *See* Nat'l Inst. for Pub. Health and Env't (RIVM), Pollutant Emission Register, *at* http://www.unitar.org/cwm/prtr/pdf/cat7/erc_geodan_nl.pdf (last visited Apr. 8, 2005). For a discussion of the PER, see C.W.A. Evers, The Pollutant Emission Register in the Netherlands (paper submitted to OECD PRTR Workshop for Countries of the Americas, July 29–31 1997, Queretaro, Mexico), *available at* www.unitar.org/cwm/prtr/pdf/cat2/PER-NL.pdf (last visited Jan. 22, 2005).

[230] The PER includes not only toxic emissions, but also other air and water pollutants emissions, recycling and other behaviors. *See* Evers, *supra* note 229, at 3–4; Nat'l Inst. for Pub. Health and Env't (RIVM), Dutch Environmental Data Compendium 2001 C5.2 (Feb. 21, 2002), *at* http://arch.rivm.nl/environmentaldata/index.html (printed version available only in Dutch). The PER targets seven source categories: (1) agriculture; (2) traffic and transport; (3) facilities (industrial sites and small and medium-sized enterprises, power plants, oil refineries and waste incinerators); (4) waste disposal sites or landfills; (5) consumers, including all residential-related emissions; (6) other small source categories, such as drinking-water companies, sewage treatment plants, and government; and (7) international aspects. Evers, *supra* note 229, at 5. Reductions are achieved through regulation and through covenant agreements between sectors and the government. *Id.* at 6; Michael P. Vandenbergh, *An Alternative to Ready, Fire, Aim: A New Framework to Link Environmental Targets in Environmental Law*, 85 KY. L.J. 803, 876–79 (1997) (discussing the Dutch covenant system).

[231] Evers, *supra* note 229, at 7. PER data are updated annually, and roughly 170 substances are included (e.g., mercury, lead, formaldehyde, benzene, and pesticides). *Id.* at 8.

[232] The Dutch PER does not separately publish data on individual behavior as a discrete source category. The releases from motor vehicle use are allocated to the "traffic and transport" sector, and emissions from residential electricity use are allocated to the facilities sector. As a result, the PER does not disclose the aggregate or mean individual and household share of releases.

I suggest allocating toxic releases to individuals who have a substantial degree of control over the releases. Determining precisely which behaviors should be included in the ITRI based on this standard requires further development, but I argue that the dioxin and other toxic releases from backyard burning and similar activities that are almost entirely within the individual's control are easily included in the ITRI reporting scheme. On the other hand, releases from the manufacturing facilities that produce nonconsumer products are easily excluded. Although on some level the emissions from these facilities are ultimately attributable to individual behavior and could be reduced through changes in consumption, individuals only have limited control over the types of manufacturing methods and pollution control efforts of manufacturing facilities.

The more difficult question involves releases that are under the partial control of both individuals and of consumer product manufacturers. I propose including in the ITRI, and thus attributing to individuals, releases from activities such as private motor vehicle use and residential electricity use. Although the emissions from these activities could be attributed to the motor vehicle manufacturing and utility sectors, individuals exercise a substantial degree of control over them through consumer product purchasing and use decisions.[233]

b. Political feasibility.—Despite the political gridlock that has prevented any major federal environmental legislative changes since the 1990 Clean Air Act Amendments, the proposed ITRI is not only administratively viable, it also is politically viable.[234] Legislators and regulators, to the extent they currently view existing sources of environmental contamination as a zero-sum game, may welcome information that will help them identify new potential least cost avoiders. In addition, legislators and regulators also may begin to confront the notion that achieving the public's demand for environmental protection cannot be done without changes in individual behavior. Legislators may recognize that, even if individuals do not change their behavior, at some point voters may assign responsibility for failing to achieve environmental goals not to themselves, but to the legislators.

In addition, the amendments do not fit neatly into the polarized Washington political landscape on environmental issues. Although environmentalists may be concerned about shifting focus from industrial to individual sources, they also may find the ITRI amendments attractive. Environmental groups have advocated without success for more than a decade to

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[233] Difficult decisions will arise regarding the attribution of emissions from residential electricity use and other activities that are currently subject to TRI reporting but that are under the substantial control of both individuals and industry. To address this problem, I propose, at least at the outset, to double count the emissions and to disclose the double counting in the analysis released along with the data.

[234] The statutes enacted since 1990 have not been major reauthorizations. *See* Stewart, *supra* note 142, at 24, 26 (noting political gridlock).

extend TRI reporting to the toxics in consumer products. They have done so by advocating legislation that would impose TRI reporting requirements on the industrial producers of consumer products, not on individuals.[235] This strategy reflects a concern about the extent to which the public will mobilize around any message other than one that places blame for pollution exclusively on industry, and environmentalists may be reluctant to take any steps that extend responsibility to the individual.[236] At the same time, environmentalists also may view the ITRI amendments as an opportunity to increase public awareness about environmental issues in general, and ultimately as a step toward changing consumer and other individual behavior. More specifically, environmentalists' concern about shifting focus from industry may be tempered by the opportunity presented by ITRI to generate data on toxic releases from consumer products, with less cost to government and the regulated community, and a more favorable expressive effect on individual behavior.

Business groups also may be ambivalent. They may be concerned about the implications of empirical studies indicating that the public tends to overestimate the risks of toxics in many situations.[237] In these situations, there is a risk that accurate information on the characteristics of a product will provoke irrational responses.[238] A less persuasive concern may be that the annual publication of individual toxic release data will lead to more accurate beliefs about the quantities of toxics released from individual behavior, and will lead to reductions in consumer product use or changes in product choices. At the same time, business groups may recognize that in the absence of changes in individual behavior, they are likely to be the sole targets of future environmental legislative or regulatory requirements.[239] In

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[235] *See, e.g.*, NAT'L ENVTL. TRUST, CABINET CONFIDENTIAL: TOXIC PRODUCTS IN THE HOME (2004) (advocating product content disclosure). Not surprisingly, this approach would continue to focus responsibility for consumer behavior on corporate polluters, an approach that has deep roots in the environmental movement. *See* WESLEY MARX, MAN AND HIS ENVIRONMENT: WASTE 108 (1971).

[236] Extending TRI to producers of consumer products but not consumers risks reinforcing the social meaning that individuals are only victims and that industrial sources are the only entities worthy of the label polluter. *See* Bradley C. Bobertz, *Legitimizing Pollution Through Pollution Control Laws: Reflections on Scapegoating Theory*, 73 TEX. L. REV. 711, 714–15 (1995); Michael P. Vandenbergh, *The Social Meaning of Environmental Command and Control*, 20 VA. ENVTL. L.J. 191, 201–04 (2001).

[237] *See* WESLEY A. MAGAT & W. KIP VISCUSI, INFORMATION APPROACHES TO REGULATION (1992); Jolls et al., *supra* note 75, at 1533–37.

[238] Like the TRI, the ITRI will provide information on the quantities of toxics released, not on the risks created. *See* discussion *supra* notes 217–228. This approach relies on the vigorous debate that will occur in the secondary information market to arrive at widely accepted risk characterizations and rational decisionmaking.

[239] Current efforts to reduce low-level ozone and non-point water pollution demonstrate the point. Many areas will not achieve a new national ozone standard without changes in individual behavior (e.g., reductions in car use and speeds, non-road motor vehicle use, consumer product use, and residential burning). *See* Vandenbergh, *supra* note 3, at 553–59. Under the Clean Air Act, areas that fail to meet the new standard will be subject to more stringent requirements, but many of these requirements will be placed on *industrial* sources. *Id.* Similarly, non-point pollution is the leading source of impaired waters

the final analysis, businesses may fall into two camps, with many consumer product firms opposed (at least those that will not fare well when the information is available) and many non-consumer product firms in favor of efforts to disclose information about individual behavior.

In short, many forces are arrayed against any statutory changes that implicate individual behavior. Yet the alignment of interests does not follow traditional battle lines, and, given the low cost and potentially high benefits, the ITRI has substantial prospects for success.

V. THE EFFECTS OF ITRI INFORMATION

Part V evaluates the implications of the environmental norm activation theory, and the ITRI in particular, for changing individual behavior. I begin in Part V.A by drawing on government and private reports to present a sample ITRI for seven chemicals. I include the mean and aggregate releases of toxics by individuals, as well as the relative shares as compared to large industrial sources.

I then examine the potential effects of the ITRI data. At the outset, the data may facilitate rational action in the easy case situations: when individuals will receive a large payoff from behavior change (e.g., because they currently internalize the risks of their toxic releases), and when the behavior change will enable them to avoid the social sanctions that may arise in close-knit groups. Although habits or other barriers may discourage rational action even in these large-payoff, close-knit group situations, the ITRI data may generate strong normative influence for behavior change.[240]

In Part V.B, I demonstrate how the ITRI also may tackle the hard case situations, where individuals will neither receive a positive payoff from behavior change nor be subject to social sanctions. The ITRI information may activate personal norms and have substantial effects on direct environmental behavior in these situations. Even if the ITRI information does not change certain environmental behaviors directly, such as when sustained and substantial effort is required, its prospects for changing civic behavior and the democratic process generally justify a more optimistic view of the prospects for normative influence than suggested by the recycling and labeling studies.

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in the United States, and urban runoff accounts for a large percentage of these impaired waters. Studies suggest that the runoff from residential areas (often attributable to individual behavior) does not pollute less than the runoff from industrial areas. *Id.* at 519–20. Yet if water quality standards are not met, the only prescriptive federal requirements in the Clean Water Act will be imposed on the *industrial* sources that are required to have discharge permits. *Id.* at 583–84; *see also* Wendy Wagner, *Restoring Polluted Waters with Public Values*, 25 WM. & MARY ENVTL. L. & POL'Y REV. 429, 444 (2000) (noting the contribution of residences to water pollution).

240 Even if an individual will achieve a large payoff from behavior change, habits or other psychological influences may serve as barriers to change. *See* Stern, *supra* note 62, at 465; Vandenbergh, *supra* note 3, at 591–97.

A. A Sample ITRI

The ITRI will provide data on the individual releases of TRI-listed toxic chemicals. The sample ITRI provided in Table 2 focuses on seven of these toxics.[241] Table 2 identifies the mean and aggregate quantities attributable to individuals, as well as the relative aggregate quantities released by all of the industrial facilities subject to TRI reporting.

CHEMICAL	MEAN INDIVIDUAL AMOUNT	AGGREGATE INDIVIDUAL AMOUNT	AGGREGATE INDUSTRIAL AMOUNT	INDIVIDUAL RELATIVE SHARE
Acetaldehyde	2.36	20,598	6410	76.3%
Acrolein	0.38	3295	41	98.7%
Benzene	23.20	203,751	4092	98.0%
1,3-Butadiene[242]	2.65	23,279	1347	94.5%
Dioxin	2.46	692	414	62.6%
Formaldehyde	6.21	54,489	5765	90.4%
Mercury	3.82	33,538	117,925	22.1%

TABLE 2: SAMPLE ITRI FOR AIR TOXICS[243]

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[241] The EPA has included the seven toxics in its Urban Air Toxics Strategy based on the risks they pose to urban dwellers. *See* National Air Toxics Program: The Integrated Urban Strategy, 64 Fed. Reg. 38,705 (July 19, 1999), *available at* http://www.epa.gov/ttn/atw/urban/urbanpg.html [hereinafter Urban Air Toxics Strategy]. The EPA has included thirty-three air toxics in this effort based on its conclusion that reductions in these air toxics could result in a cancer risk reduction of 75% and a substantial reduction in non-cancer risks. For an overview of the Urban Air Toxics Strategy, see U.S. EPA, NATIONAL AIR QUALITY AND EMISSIONS TRENDS REPORT, 1999, at 80–96 (2000). Table 2 provides an initial ITRI-type estimate of the quantities released by individuals for seven toxics: acetaldehyde, acrolein, benzene, 1,3-butadiene, dioxin, formaldehyde and mercury. The listing for dioxin in the Urban Air Toxics Strategy is "2,3,7,8-tetrachlorodibenzo-p-dioxin (& congeners & TCDF congeners)." *See* Urban Air Toxics Strategy, *supra*, at 38,715.

[242] 1,3-Butadiene has been identified as a probable human carcinogen. *See* EPA, MOTOR VEHICLE HAPS, *supra* note 40, at 54. Mobile sources comprised approximately 60% of all 1,3-butadiene air emissions in the U.S. in 1996, *id.* at 81 tbl.IV.A-1. Using the methodology, discussed *supra* note 42, individuals the emitted 23,279.6 tons of 1,3-butadiene in 1996 just from mobile sources. In contrast, TRI air emissions of 1,3-butadiene were only 1347 tons in 1996, or 2.4% of the total national amount of 1,3-butadiene emitted. *See* EPA, 1996 TRI EXPLORER DATABASE, *supra* note 42; EPA, MOTOR VEHICLE HAPS, *supra* note 40, at 81 tbl.IV.A-1. In 2007, the volume of 1,3-butadiene emitted from mobile sources is expected to decrease 43% from 1996 levels. *See* EPA, MOBILE SOURCE PROJECTION, *supra* note 42, at 22 tbl.4. Nevertheless, in 2007 the motor vehicles of private individuals will still emit 12,453.9 tons of 1,3-butadiene, or 69.1% of the emissions from all mobile sources. *Id.* at 23, 26 tbls. 5, 8.

[243] All aggregate totals are for 1996, and the mean individual figure is the estimated total toxic chemical releases for individuals in 1996, divided by 281 million, the United States population in 2000. *See* U.S. EPA, *supra* note 11. With the exception of dioxin, all mean totals are in ounces and all aggregate totals are in tons. For the methodology used to calculate the aggregate individual amounts of acetaldehyde, benzene, formaldehyde, and mercury, see Vandenbergh, *supra* note 3, at 567–72. For a

As Table 2 demonstrates, individuals release substantial quantities of these toxics in the aggregate and in some cases a relative share that is far more than all large industrial sources combined.[244] Not surprisingly, the mean individual releases are generally small, often only several ounces per year, although they provide a valuable benchmark for assessing changes over time. In addition, if expressed over a lifetime, the totals are often striking (e.g., the 3.82 ounces of mercury per year translate to almost 17 pounds over a 70-year lifetime). The individual behaviors that release the toxics included in the sample TRI range from backyard burning of garbage (the leading source of dioxin), to automobile use (a leading source of acetaldehyde, acrolein, benzene, and formaldehyde), to residential electricity use (a leading source of mercury).

B. Effects on Individual Behavior

In addition to simply facilitating rational risk avoidance in the easy case situations, the ITRI information has the prospect of influencing individual environmental behavior in hard case situations by activating personal norms and by increasing social norm enforcement. Norms theorists argue that if an individual's personal norms are activated, the individual will be more likely to levy social sanctions on others, and will be more likely to assume that others will do the same. I focus here on the activation of personal norms, but I assume that if the ITRI information activates personal norms, or creates a perception that others' personal norms have been activated, social norm enforcement will increase as well.[245]

1. Direct Environmental Behavior.—The potential effects of ITRI information on direct environmental behavior can be evaluated by examining the release of dioxin from backyard burning.[246] The ITRI will provide data regarding individuals' mean and aggregate releases of dioxin, and the types of behavior that cause the releases. The resulting debate about the effects of individuals' dioxin releases will provide information about the risks created by these releases. The data on the *mean* and *aggregate* quantities of toxics released by private individuals may be particularly important for linking the

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discussion of the calculation of the totals for acrolein, see discussion *supra* note 42. The dioxin estimate includes all dioxin and dioxin-like compounds and the aggregate totals are expressed in gram toxicity equivalents ("gTEQs"), not tons. *See* DIOXIN REPORT, *supra* note 5, at 279 tbl.A-28. The mean individual total for dioxin is expressed in millionths of a gTEQ. The categories included as individual dioxin emissions are "backyard barrel burning, air," "residential wood burning, air" and "cigarette smoke, air," and the total for industrial emissions is the total of all other dioxin emissions from the National Institutes of Medicine report, not from TRI data. *See id.* All dioxin figures are for 2002/2004. *Id.*

244 For some toxics, other categories of sources such as small businesses may comprise a large percentage. As is the case with TRI, however, these sources are not accounted for in this analysis.

245 *See* discussion *supra* note 89.

246 Similar processes will occur for driving and other toxics-releasing activities.

abstract environmental protection norm to concrete norms against specific individual behaviors, such as burning garbage in backyard barrels.

The norm activation process for dioxin will occur in several steps. First, information will be conveyed through media stories that report on the combined release of the TRI and ITRI data, as well as government and interest group follow-up reports. The individual will then form a new belief about the consequences of backyard burning (AC). Government- or interest group-generated information will then identify steps that individuals can take to ameliorate the problem. This information will change beliefs about the individual's responsibility for reducing the releases of dioxin through backyard burning (AR). The belief change will activate a concrete norm against backyard burning and the individual will feel an obligation to act.[247]

As discussed in Part I, the effect of belief change on norms regarding backyard burning has been examined empirically, although the study examined the burning of yard waste, not garbage.[248] The study concluded that those who believed that adverse consequences (AC) arise from backyard burning and believed that they could reduce those adverse consequences (AR) burned less.[249] The effects of the ITRI information on backyard garbage burning are likely to be at least as pronounced, given the substantial toxicity of dioxin and of other chemicals released from garbage burning.[250]

Nevertheless, in many cases environmental norm activation alone may be insufficient for behavioral change. In particular, individuals may believe that although they release large quantities of toxics in the aggregate and that reductions in those releases will reduce the harms caused by the toxics, they may not act if they conclude that others have not done or will not do their fair share. In short, they may not act if they fear that they will be suckers if they do. Reciprocity norm activation may be necessary in these situations.

For dioxin, the ITRI may accomplish this task by providing data from which individuals can assess the dioxin releases by all individuals relative to other source categories and their own behavior relative to the mean individual. In the ensuing debate, norm entrepreneurs will have the information

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[247] Of course, even if the information provided is accurate, complete and clearly communicated, the public will not necessarily act rationally in response. *See* Stewart, *supra* note 142, at 141–43.

[248] *See* Van Liere & Dunlap, *supra* note 83, at 179–80, 187.

[249] *Id.* at 184–85 (finding that significant zero-order relationship existed between AR and yard burning behavior, that AC is indirectly involved, and noting that due to widespread media coverage "the negative consequences of burning were made so obvious that differences in awareness had little effect"); *see also* Dunlap & Van Liere, *supra* note 73, at 204–05; Heberlein, *Land Ethic Realized*, *supra* note 74, at 79.

[250] In addition, a more recent empirical study also suggests that individuals who hold an abstract environmental norm are more likely to act to reduce toxic releases if they are aware of the consequences. *See* Stern et al., *supra* note 82, at 220 (concluding that awareness of consequences regarding human health effects of toxics can activate norms against harming innocent people); *see also* Flannery & May, *supra* note 73, at 653 (concluding that awareness of the health consequences of toxics is strongly correlated with business managers' intentions to comply with hazardous waste regulations).

necessary to frame arguments for individual change in terms of individuals' "fair share" in response to actions taken by other polluting sectors, not just in terms of a more vague moral obligation to future generations.[251] For example, the sample ITRI provided in Table 2 demonstrates that individuals in the aggregate release far more dioxin than do all large industrial sources combined. Thus, individuals' relative share of dioxin emissions is large. Moreover, as Table I in Part I demonstrates, the comparisons over time indicate that individuals have increased dioxin emissions, while industrial sources have reduced emissions dramatically. For individuals who hold the reciprocity norm, the relative data will change beliefs regarding the individuals' share of dioxin releases as compared to the mean individual,[252] and all individuals' relative share (AC) as compared to large industrial sources. The ITRI and the secondary information market will identify the steps individuals could take to reduce their share as compared to large industrial sources (AR). The belief changes thus may link the abstract reciprocity norm to concrete norms regarding backyard burning and other dioxin-releasing behaviors.

In sum, the product of the mean, aggregate, and relative data will be environmental protection and reciprocity norm activation. The norm activation will increase the likelihood that individuals will form intentions to change behavior and will change behavior regarding dioxin, assuming that they are not constrained from doing so.[253] Figure 2 provides a diagram of the effects of the ITRI dioxin data.

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[251] In addition, by providing a quantification of the mean individual's toxic releases, the ITRI data will make it more likely for reciprocity norm activation by enabling individuals to compare their behavior to changes in the mean individual release figure over time. The ITRI data will make it more possible for government and non-profit groups to develop reports and other ways of educating individuals about how their behavior compares to the mean. Some of these efforts are already underway. *See, e.g.*, Airhead, *supra* note 214 (providing Web-based calculator of individual air emissions). The framing of the individual toxic release information also is likely to influence individual decisionmaking. *See, e.g.*, Jon D. Hanson & Douglas A. Kysar, *Taking Behavioralism Seriously: The Problem of Market Manipulation*, 74 N.Y.U. L. REV. 630, 685 (1999) (noting that "subjects have shown a remarkable proclivity to exhibit different preferences based solely on the manner in which options are presented").

[252] Although no data will be released on any specific individual's toxic releases, individuals will be able to assess whether they engage in any of the behaviors identified by EPA that contribute to the mean and aggregate release figures.

[253] The ITRI data also may improve the effectiveness of labels and norm campaigns. For example, labels may not include mean, aggregate and relative information because the information is difficult to obtain. The new ITRI data may provide the necessary information to label writers. In addition, if the ITRI data change beliefs about the effects of individual behavior, even the type of information typically provided by labels may have an increased effect on behavior. Similar effects should arise for recycling and other norm campaigns.

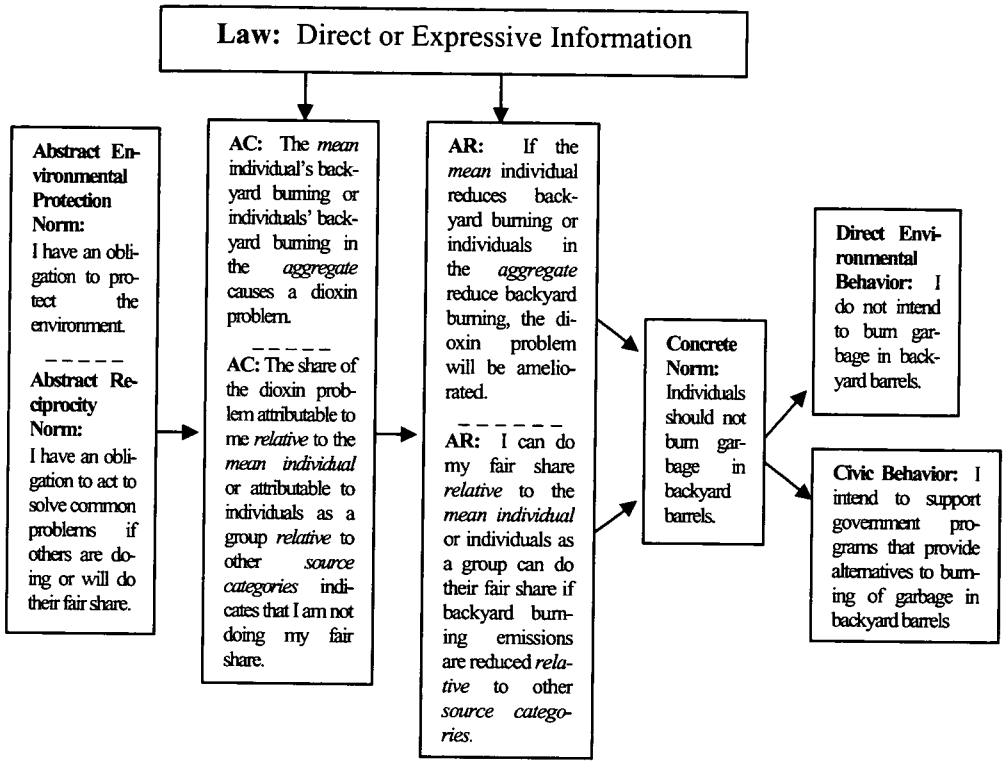

FIGURE 2: EFFECTS OF ITRI DIOXIN DATA

In addition, by not requiring government agencies to become involved in controversial risk assessment judgments, the ITRI approach will be far more feasible and less resource intensive for the EPA than would be many potential other informational regulatory measures, such as government-run labeling schemes and norm campaigns.[254] Although the data on quantities released do not translate directly to risks, they are an important first step for prioritizing and designing government interventions.

2. Civic Behavior.—In addition to changes in direct environmental behavior, the ITRI information may induce changes in civic behavior, such as voting or expressing support for government investments or policy changes.[255] Changes in civic behavior may be particularly important when

[254] The ITRI approach also will provide data on trends in performance, creating incentives for continual improvement. *See* Karkkainen, *supra* note 163, at 347 (noting that labeling requirements do not "produce a TRI-like stream of generally available and comparable performance data").

[255] The ITRI also may save public funds by reducing the financial incentives necessary to change

the underlying direct behavior change will require sustained or substantial effort. The recycling and labeling studies conclude that norms may have limited effects on these types of direct behaviors, and they recommend investments in infrastructure and financial incentives. Studies suggest that less normative influence is often needed to change civic behaviors than direct behaviors,[256] thus the ITRI information may build public support for these government investments even when it does not change the underlying direct behavior.

The dioxin example demonstrates how the ITRI data may affect civic behavior. In some communities, backyard barrel burning is a vestige of the trash disposal methods used when the areas were more rural, yet the areas are now within expanding metropolitan areas with garbage collection services. In these areas, backyard barrel burning sometimes occurs simply because the barrels have been left on-site at residences long after the garbage collection service was initiated.[257] Simple removal of the barrels in these communities may reduce the dioxin releases at very low cost, and the ITRI may provide the information necessary to enable rational decisionmaking. In other communities, where trash hauling services are not available, information about the dioxin released from backyard burning may be necessary to generate the public support for community-wide garbage collection or to fund public information campaigns that inform individuals about materials that should not be burned in backyard barrels.[258]

C. Effects on Rational Risk Regulation

Finally, in addition to the changes in direct environmental and civic behavior, the ITRI will facilitate more rational risk regulation, a topic that has been the focus of extensive interest among academicians and policy-

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targeted behaviors. *See* Stern, *supra* note 62, at 473–74 (noting that financial incentives are important, but that information at some point may predict more variance than the size of the financial incentives). As Stern notes, in these situations, "[r]esponse to a monetary incentive cannot be adequately modeled by applying a standard estimate of the price elasticity of demand." *Id.* at 474.

256 *See* discussion *supra* note 91; *see also* Scott, *supra* note 51, at 1620; Stern, *supra* note 62, at 466 (noting that "[w]hen capabilities and constraints strongly predispose for or against action, attitudes and other personal-domain variables matter little in the short-run, even though in the longer run they may impel people to political or other actions to gain needed capabilities or remove constraints").

257 *See supra* note 38.

258 Of course, the costs and benefits of community-wide garbage collection would have to be assessed. Acrolein releases also may be reduced by changes in both direct environmental and civic behaviors. The acrolein released by private motor vehicle use could be reduced by changes in driving styles, driving speed, idling, and consolidation of trips, among other steps, and the large volumes released by motor vehicles as compared to industrial sources may make public information campaigns cost-effective. The ITRI information may generate public support for government action and thus may facilitate resource allocation to public information campaigns. Large changes in some areas, however, may arise principally through the construction of mass transportation. In these areas, public support for government action may be essential given the resources required and the long payoff times for mass transportation.

makers over the last several decades.[259] In particular, it will enable government officials to make more informed targeting decisions for regulatory policy and enforcement, and to evaluate the effectiveness of those measures.[260] The absence of information on individual behavior has encouraged policymakers to focus on industrial sources to the exclusion of individuals and other sources.[261] The data on overall quantities of toxic chemicals released by individuals in the sample ITRI do not indicate that a regulatory response is required for any one chemical, but they raise a red flag, much like the red flag that was raised when the TRI data were first released in 1989. EPA staff at that point indicated that the quantities of industrial toxic chemical releases were "startling," and the EPA then initiated various risk assessment and risk management steps.[262] The ITRI information may have the same effect on policymakers that the TRI information had in 1988: it may open regulators' eyes to the magnitude of the source and the need to re-examine regulatory efforts.

VI. CONCLUSION

Individual behavior in negative-payoff, loose-knit group situations presents tremendous challenges to norms theorists and regulators. The first challenge is simply to conceptualize individual behavior as a distinct source of social problems. The failure to do so has impeded rational decisionmaking not only regarding environmental protection, but across a wide range of fields.[263]

The toxic releases attributable to individuals and households I identify in this Article demonstrate the importance of individual behavior as a discrete source of environmental problems. Trends in population and consumption rates will make many of these problems even greater areas of

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[259] *See* STEPHEN BREYER, BREAKING THE VICIOUS CIRCLE: TOWARD EFFECTIVE RISK REGULATION (1993); STEPHEN BREYER, REGULATION AND ITS REFORM (1982); SIDNEY A. SHAPIRO & ROBERT L. GLICKSMAN, RISK REGULATION AT RISK (2003); CASS R. SUNSTEIN, RISK AND REASON: SAFETY, LAW, AND THE ENVIRONMENT (2002).

[260] As the Italian Minister of Environment recently stated, "[a] government can follow only the will of its citizens. The citizens must understand the importance of environmental protection." Eric J. Lyman, *General Policy: Italian Environment Minister Says Cultural Awareness of Environmental Issues Needed*, INT'L ENV'T DAILY (BNA), June 30, 2003, at 1.

[261] For example, the absence of ITRI-type data influences the way EPA frames studies of environmental quality. The EPA Draft Report on the Environment 2003 states regarding toxics that "[m]any industries release toxic substances into the air, soil and water through their manufacturing and production activities," U.S. EPA, *supra* note 11, at 3–8, but the toxics section of the Report does not identify toxic releases from individuals or seek to quantify them. The discussion of hazardous wastes provides estimates of the quantities generated per household, but not how those quantities compare in the aggregate to the releases from industrial or other source categories. *Id.*

[262] The steps included the initiation of voluntary programs such as the 33/50 program and the inclusion of stringent new air toxics requirements in Title III of the Clean Air Act Amendments of 1990. *See supra* note 160.

[263] *See* Vandenbergh, *supra* note 3, at 617–20.

concern over the horizon. In addition, the social ills that arise from individual behavior in negative-payoff, loose-knit group situations include not only environmental problems, but the voting, Internet file-sharing, and handicapped parking issues identified at the outset, as well as tax noncompliance, street crime, and natural resource depletion.

Other social problems do not arise in negative-payoff, loose-knit group situations, but personal norm activation may nevertheless be necessary to induce widespread behavior change. For example, many behavior changes that would generate a large payoff for the individual are blocked by habits or other psychological barriers. Highway traffic safety problems, obesity, and smoking often share these characteristics.[264] Personal norm activation may be necessary to supplement the limited effects of social norms, legal requirements, and economic incentives on these types of behaviors.

The second challenge faced by norms theorists and regulators is the difficulty of developing integrated behavioral theories and legal methods that reflect the importance of personal norms. Although personal norms certainly pose a challenge to norms theorists, approaches that fail to account for personal norms will be unable to generate viable legal and policy solutions for the wide range of social ills identified above. As the recycling and labeling studies demonstrate, theories that do not account for personal norms may lead to recommendations for expensive government remedies, such as infrastructure or financial incentives, yet in the absence of personal norm activation, regulators will often lack the background political support to implement these measures. Methodological risks, therefore, are well worth taking.

The approach I take in applying the norm activation concept to environmental behavior demonstrates that it is possible to strike a workable balance between universal theories and tailored, behavior-specific approaches that generate testable predictions and policy-relevant recommendations. In particular, the norm activation concept provides a generalizable mechanism for predicting normative influence. The approach I have taken in developing the environmental norm activation theory also is generalizable: identification of related categories of behavior; of the abstract norms most likely to influence those categories; and of the belief changes necessary to cause norm activation. The theory generates testable predictions about the types of information that will have the greatest influence on behavior.

The predictions, in turn, can form the basis for more successful legal reforms. The proposed ITRI demonstrates the type of reforms that can be generated by applying the concept of norm activation to particular categories of behavior. The belief changes that will be generated by the ITRI have the prospect of inducing changes in many direct environmental behaviors at

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[264] *See, e.g.*, Cass R. Sunstein & Richard H. Thaler, *Libertarian Paternalism Is Not an Oxymoron*, 70 U. CHI. L. REV. 1159, 1167–68 (2003) (discussing effects of obesity, smoking, and other behaviors); Vandenbergh, *supra* note 3, at 617–18.

low cost. In addition, for behaviors that require sustained or substantial effort, the belief changes may generate the changes in civic behavior necessary to engender support for the financial incentive schemes and infrastructure investments that will facilitate direct behavior change. The ITRI thus demonstrates that a better understanding of the mechanisms of norm activation combined with the specific norms and beliefs for important categories of behavior can lead to more effective regulatory policy.